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ORIGINAL ARTICLES.

MALARIA.

BY ELLSWORTH D. WHITING, A.B.

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AURORA, ILL.

Malaria, or paludism, is a non-contagious, infectious disease, characterized by typical paroxysms, the principal pathologic changes being in the blood, liver and spleen. Its etiologic factor is a specific protozoon, the plasmodium malariæ of Laveran, which can generally be demonstrated in the red blood corpuscle.

Malaria may be considered a primitive disease, that is, one found in newly settled countries. It attacks the settler when he turns the soil for the first time, when there is no drainage and when the shallow wells fill from the surface. As soon as the swamps are drained and the wells freed from surface water the "chills and fever" disappear.

As to the geographic distribution of malaria, it is quite extensive, being found in tropical, subtropical and temperate zones. In the northern part of Africa malaria is endemic. It was there that Laveran made his first discoveries. In Europe, southern Russia and Italy are the common seats of the disease though it is found to some extent in England, France and Germany. On our own continent malaria is endemic in the South, Mexico, Texas, Arkansas, Louisiana and Missouri, and more common in the North than was formerly supposed. In the West Indies it exists in its most malignant forms.

As to the manner in which the parasite affects entrance into the human body medical opinions differ. Until a few years ago there was a consension of opinion that malaria was an air-borne disease, the lungs being the only infection atrium. Those who upheld this theory based their opinions upon the fact that malaria was common among people living in low, marshy regions abounding in vegetable growth. These men claimed that the organism had its habitat in the soil, from whence, under favorable conditions, it was disseminated through the atmosphere and thus readily reached the air passages and circulation of the human organism. They claimed also that while moisture was not necessary to the development and spread of the disease it greatly aided it in its growth. They maintained for this reason that night air was much more heavily charged with malarial organisms than the air during the day.

Within the last few years other investigators have gone so far as to state that malaria is not an air-borne disease in any sense of the word. After extensive investigations these gentlemen have proven to their own satisfaction that this disease is purely of water-borne origin. To maintain their position they have brought to bear very strong evidence. They cite numerous instances where gangs of laborers working in the same malarial districts were dissimilarly affected, those drinking from the surface water suffering from the disease, while those drinking boiled water, or that obtained from deep wells, were unaffected. These men all breathed the same air both night and day. This is a strong argument in favor of the water-borne theory. It may be argued that the vitality of those drinking the pure water was sufficient to resist the action of the organism, even had it gained entrance into the body through the air passages, while the vitality of those drinking the surface water was naturally lower. This objection would h ld good were only one case cited, but it must necessarily fail when hundreds of similar cases are given. Another proof of the probability of the water-borne infection is demonstrated by the fact that here, in the midst of Chicago, in the heart of winter, when there is no building and excavating, malaria is present in almost every hospital in the city. The writer has demonstrated the presence of the organism in the blood of Cook County Hospital patients this winter who have not been away from the city in many years. The air-borne theory does not explain clearly these midwinter infections while the water-borne theory does. Many streams flow into Lake Michigan from the flats of Illinois and Indiana. These streams teem with malarial organisms. They empty their polluted waters into the lake and the currents flowing northward find their way into the cribs and thence to the dwellings of the citizens of Chicago. It is a noteworthy fact that not only is malaria found in the wards of Cook County Hospital but also among families living on the finest boulevards. Taking into consideration the array of testimony on either side, the writer is inclined to lean toward the water-borne theory, yet granting that in some cases infection by air seems highly probable.

Formerly many held that the organism gained entrance into the body through the stings of insects. This theory is upheld by but few to-day.

As a rule malaria is most prevalent in the spring and fall, yet the disease is present to some extent during all seasons of the year.

Under like conditions malaria is no respecter of persons as to sex. It is, however, more common among men than women, because of their manner of life, as they are more exposed to its etiologic factor. Children under one year of age rarely have the disease.

There can be but little doubt as regards the difference in degree of personal receptivity. All persons of lowered vitality are readily susceptible to the disease, nevertheless in men full of health there is great difference in the degree of immunity. This immunity may be natural or acquired. Persons going into a malaria district seem to acquire immunity after a lapse of years, while those born in the malarial atmosphere are often never affected by the disease.

The negro is much less affected than the white man, the ratio being as three is to one.

The history of the discovery of the plasmodium malariæ and the various theories set forth by the different observers as to its character furnish interesting matter for study and investigation.

At first thought it would seem as though a recapitulation of the theories and observations of students interested in the malarial organism would be superfluous, but to understand fully the following pages such a résumé will be of great advantage.

Perhaps the greatest honor is due Laveran, after whom the parasite is named; however, extensive investigations and discoveries have since been made by Golgi, Marchiafava, Celli and others.

Although Lewis, in 1879, discovered hematozoa in the blood of warm-blooded animals, Laveran, a French military surgeon, in 1880, was the first man to demonstrate living organisms in the blood of individuals suffering from malarial fevers. At this time Laveran was stationed in Algeria, where malarial fever was prevalent. This afforded him excellent opportunity for studying the disease and the parasite. Laveran made his first discovery in November of this year. While examining the blood of a malarial patient he observed, floating in the plasma among the corpuscles, motile pigmented bodies provided with actively moving filaments or flagella. The next month, in the examination of forty-four cases of supposed malaria, in twenty-six the parasite was demonstrable. As a result of his studies he describes the parasite under three forms.

1. Crescentic or ovoid forms 8 or 9 μ in length and 2 μ in diameter. These bodies are colorless and transparent except for small clumps of pigment in the center or at the ends of the organism. The pigment granules assume the form of wreaths. The bodies are practically non-motile and in some instances pale, protoplasmic filaments appear to connect the extremities. Laveran believed that the crescentic forms originated in the ovoid or spherical flaggellate forms, next to be described, and had the power of returning to the spherical shape.

2. Bodies which in repose are spherical and transparent, 5 to 7 μ in diameter and contain rings of rounded pigment granules of equal size. When these bodies are found in motion they are provided with from three to five long, thread-like processes which he calls "flagella." The organism appears to use these as a means of locomotion. In length they are two or three times that of the diameter of a red corpuscle, the ends of the filaments being enlarged. When the parasite is in motion the protoplasm seems to be greatly agitated, as is evidenced by the rapid rotating and dancing of the pigment granules within. He describes the flagella as being developed outside of the organism and detached when complete in their development. He observes particles of pigment to emanate from the organism through these flagella.

3. Laveran describes a third form which he supposes to be dead organisms (cadavers). These are of spherical form, from 8 to 10 μ in diameter, granular, non-motile, not provided with flagella and contain irregularly arranged pigment granules. At times he finds in these bodies granules which are fiery red or blue in color.

Later, in 1881, Laveran added a fourth form to his classification. He describes bodies transparent and spherical containing both motile and non-motile pigment granules. These bodies are as a rule small, varying in size from one-sixth to the full size of a red corpuscle. In the smallest there is but one granule of practically non-motile pigment. In the larger bodies from eight to ten motile pigment granules are present.

In summing up his discovery, Laveran says: "There exists in the blood of patients suffering from malaria parasitic elements which have hitherto been confounded with melaniferous leucocytes. The presence of these parasites in the blood is probably the cause of the manifestations of paludism."

As to the nature of the organism Laveran concludes that forms 1 and 2 consist of an accumulation of cysts, formed in the corpuscles by extra corpuscular organisms represented by the flagella. These, developing at the expense of the red corpuscles and acquiring motility, separate themselves from the products of their activity and live independent lives.

In 1882 the discoveries of Laveran were corroborated to a great extent by Richards, who also studied the parasite in Algeria. Richards describes the earlier stages more accurately than Laveran. He notes a form in which there is no pigment and advances the theory that this form precedes the stages in which little pigment is found. He discovers that as the organism increases in size and the pigment in quantity, that the corpuscle expands and loses its color and finally the cell wall breaks. He agrees with Laveran in that the organism in its perfected state consists of the flagellate form and finally concludes that the parasite is extra corpuscular although he was at first inclined to consider it as endoglobular. He advocates the theory that the number of organisms increase until the beginning of the paroxysm. He says "they produce the fever, the fever kills the parasite, and falls in its turn, the process of reproduction going on between paroxysms."

At this time in Italy investigations of a different nature were being carried on by such noted biologists as Klebs, Tomassi, Crudeli, Marchiafava, Gaule and Celli. These men, looking at the origin of malaria from the bacteriologic standpoint, were convinced that they had demonstrated a micrococcus which, when present in the human organism, produced symptoms of malaria. They found small round bodies in the blood of malarial patients which stained with methylene blue. They found also ring-shaped bodies. These they claim to be of bacterial origin. They distinguished also the pigmented bodies of Laveran and Richards, but consider these granules as degenerated debris caused by the action of the bacterial organisms upon the red corpuscles. They explain the existence of filaments described by Laveran and Richards as resulting from the temperature and show by actual experiment that normal red corpuscles heated from 40 to 48 degrees C. show these filaments. They account for the crescents by claiming that they are caused by the discoloration of a portion of the periphery of the red corpuscle, the rest retaining its color. In 1885 Marchiafava and Celli withdrew this theory of the bacterial origin and agreed with Laveran and his parasitic theory. They carefully studied all the organisms noted by Laveran and Richards, and furthermore describe organisms containing abundant pigment, within which they are able to detect a differentiation into smaller bodies. In some of these cases the pigment is collected in the center, and evidence of segmentation is present in the surrounding protoplasm,

while in others the pigment seems to be arranged in the center and segmentation complete. The fact that they observed small hyaline forms greatly influenced them in their change of position. These smaller hyaline forms they describe as consisting of two zones, an outer or thicker more refractive zone, and an inner more granular and less refracting one. These organisms they describe as ameboid and provided with filaments issuing from the outer zone. They disagree with Laveran in the position of the organism. They hold that the organism is endoglobular, while Laveran still held to the belief that they were attached to the external surface of the corpuscle. Therefore to Marchiafava and Celli must be given the great credit of being the first to demonstrate segmentation and to bring forth the theory of the endoglobular existence of the parasite. Although they are unable to prove their belief, they state as highly probable that the process of segmentation is one of reproduction. Laveran also believed that the small forms which he discovered were of embryonal nature. These men ridicule the cystic theory of Laveran and the existence of separate crescentic types.

Subsequent to the discoveries of Laveran, Richards, Marchiafava and Celli, many investigations were made, confirmatory to the observations of these men. In 1885 Councilman and Abbott made extensive research. They demonstrate the presence of the organism in the capillaries of the brain, liver and spleen in two cases of comatose, pernicious malaria. These organisms are both pigmented and non-pigmented, and within and outside the red corpusles.

Summarizing the investigations up to this date (1885) we must describe the malarial organism as consisting of a small, hyaline, ameboid, endoglobular parasite which on development shows fine, actively moving pigment granules. These bodies, eventually filling up the red corpuscle, decolorize, and finally destroy it. Having reached the adult stage the pigment becomes collected in the center of the organism while segmentation is observed in the surrounding protoplasm. The small hyaline bodies, according to Laveran, have the power of taking the form of crescents from which pigment and flagella develop. Laveran believes that the flagella are the organisms, that they are of extra corpuscular nature and the body containing the pigment the result of cystic degeneration. On the other hand Marchiafava and Celli hold that the pigmented body is the true organism, that it is endoglobular, and the flagella simply pseudopodia.

Up to this time there had been no disagreement as to the relation of the organisms to the clinical features. It was ceded by Laveran and his followers that the various forms observed were all of the same organism. Laveran says himself: "I do not believe that there exists a constant relation between the forms under which the hematozoa exist in the blood and the clinical manifestations of paludism. One can only say that certain forms of the parasite are more often seen in certain cases, the crescents, for example, in relapses and in malarial cachexia, as I have often demonstrated."

In 1885, when Golgi published an account of his discoveries, the theories which he set forth caused a division among students of malaria. Two factions sprang up. At the head of one was Laveran, while Golgi was the leader of the second. Laveran asserts, as has been said, that there exists no relation between the clinical manifestations of the various types of the fever and the several forms of the parasite. Golgi, however, holds that there are probably many distinct types of the parasite and that there is a distinct and readily recognizable relation between the form of parasite and clinical manifestations.

Golgi's theories are based upon the study of the parasite found in quartan ague. Although Marchiafava and Celli note in a few cases that segmentation was seen during the paroxysm, Golgi was the first to demonstrate the fact that segmentation of a group of organisms could always be seen during a malarial paroxysm. He also proves conclusively that the severity of the attack is in direct proportion to the number of segmenting organisms. In the study of the parasite of quartan ague during the first day after the paroxysm a small, hyaline, non-pigmented body in the red corpuscle is observed. This body is motile but sluggish in its movement. On the second day the body is increased slightly in size and a few granules of pigment are present in the center. The granules of pigment are large in size, of a brownish red color, and move about slowly in the organism. This organism gradually grows until six hours before the next paroxysm, when signs of segmentation become apparent. At this stage the organism has practically filled but has not distended the corpuscle. Pigment granules are still few in number and their movement sluggish. Before segmentation the pigment collects into the center; soon radiating lines divide the organism into from eight to ten segments, forming the so-called marguerite forms of Golgi. Soon the organism is seen to divide and the hyaline forms to pass out into the plasma. At the same time hyaline forms are seen to appear in the red corpuscle. Although Golgi did not see these hyaline forms enter the red corpuscles, he was firmly convinced that they were one and the same. In cases of quotidian paroxysms he demonstrates the presence of a triple infection, that is, the presence of three distinct groups of parasites segmenting on different days. Thus, one group segments every day, causing daily paroxysms. In like manner he proves the cause of the tertian paroxysm(?)

These observations have been in most instances proven by many careful and conscientious students.

Antolisei agrees with Golgi in the main, but insists that the paroxysm is caused by the segmentation and the rupturing of the red corpuscle and not by the entrance of the hyaline bodies into the corpuscles as is held by Golgi. He proves his point by showing that quinin, even when administered in full doses shortly before a paroxysm, will not stop the paroxysm or segmentation, but will prevent the hyaline bodies from entering the corpuscles.

Golgi, after having extensively studied the parasite of quartan ague, demonstrates also the presence of an entirely different type of organism as productive of the symptoms of tertian malaria. He studied this organism carefully for three years (1886 to 1889) and concludes from the result of his researches that the embryonal form of the tertian parasite is similar to that of the quartan. This form, he says, "consists of a small, round, non-pigmented, transparent, motile body in the red corpuscle, which reaches its adult stage in forty-eight hours. At the end of this time an abundance of pigment is present and segmentation with accompanping paroxysm takes place with the appearance of hyaline bodies in the red corpuscles." Golgi moreover notes other differences between the

tertian and quartan parasite which may be tabulated as follows:

Motion. The tertian organism in both its hyaline and adult forms is more active than the quartan.

Pigmentation. 1. The number of granules in the tertian type is greater than that in the quartan. 2. These granules are much smaller in the tertian. 3. Their movement is more pronounced; and 4. Their color is lighter in shade.

Size. As the tertian organism grows it distends the corpuscle, which loses its color, while in case of the quartan parasite the corpuscle does not swell and is but slightly decolorized. In fact, the corpuscle containing this organism seems to shrink. The adult tertian parasite is much larger than the quartan.

Segmentation. 1. During segmentation the tertian organism is seen to divide into from fifteen to twenty segments, while the quartan divides into from eight to twelve. 2. The segments of the tertian parasite are smaller than the quartan. 3. During the segmentation of the quartan parasite Golgi demonstrates the presence of a central refractive area, but is unable to find such an area in the tertian. This refractive area appears to have a definite wall of differentiated protoplasm and contains the pigment granules during segmentation. As regards the destiny of this latter area Golgi is uncertain. He presents two theories; one to the effect that the body remains active and enters the red corpuscle and reproduces its like, the other theory being that it is consumed by phagocytes.

Beside the methods of segmentation common to the tertian and quartan forms Golgi demonstrates another form. In this the pigment is seen to collect in the periphery of the organism, leaving a clear center in which one or two spherical, sporelike bodies appear.

In order to disprove this form of segmentation Antolisei spent much study and experimentation. He finally decided that the process was one of degeneration and that the spherules discerned by Golgi were vacuoles. When the organism had completely destroyed the corpuscle Antolisei observed a spherical area in the center of the organism near its periphery. "Soon," he states, "a transparent, distinctly outlined sphere appears in the area, and about this sphere vacuoles appear which constantly multiply in number and seem to decrease in size. Surrounding these vacuoles is motionless pigment, while the pigment removed from the central area seem to increase in motion. Sometimes the enclosing membrane bursts and a hernia of the contents of the organism results. In this cut-off or fragmented portion the same process of vacuolization continues. This process goes on until finally the organism is completely filled with minute spherules, separated by motionless pigment granules and enclosed within a membrane which is probably the cell wall. Finally this wall bursts and throws the contents of the parasite into the plasma." Antolisei concludes that vacuolation, fragmentation and flagellation are all forms of degeneration. He bases his theory upon the fact that he finds all these changes in organisms of the same size. He also claims that true segmentation rarely takes place in the circulating blood, but generally occurs in the internal organs. He bases this belief upon the fact that segmenting organisms found in the circulating blood are seldom larger than the red blood corpuscles, while the true segmenting forms found in the internal organs are much larger. He believes that the larger forms found in the circulating blood are dead organisms undergoing vacuolation or segmentation.

The comparative examination of blood taken from the spleen and peripheral circulation has been carried further by Bastianelli and Bignami. They determined that during apyrexia the number of organisms in the spleen and peripheral circulation was the same, but that during, and just before the paroxysm, many more organisms were found in the spleen than in the periphery. They explain this fact upon physiologic grounds, stating that when the corpuscles are intact there is naturally no tendency for them to collect in the spleen, but when they are the subject of pathologic change these disabled cells immediately seek the spleen for removal.

These men set forth the theory that in quartan ague the distribution of the organism is more uniform than in the tertian type. They explain this by stating that in this type there is less disturbance in the continuity of the corpuscle while it is being destroyed. They also discovered bodies provided with a small amount of pigment, surrounded by from five to ten round sporelike bodies. These they term organisms of a shorter cycle, since they found them in irregular and anticipating quotidian fevers. They agree with Antolisei as to the probable nature of vacuolization, flagellation and fragmentation, and furthermore suggest that the severity of the fever is in inverse ratio to the number of these organisms present.

Councilman, in 1887, first associated with irregular and continuous fevers another organism clearly distinct from the quartan and tertian types. He discovered a crescentic and elongated body which he found to be constant in remittent fevers. Thus he declared that he was always able to distinguish an intermittent and remittent type by the blood examination. In 1889 the discoveries of Councilman were corroborated by Marchiafava and Celli and Pietro Canalis.

The description of this type given by Canalis divides it into two classes: 1, the rapid cycle and 2, the slow or crescentic cycle. He terms this latter type the semi-lunar type.

Canalis determined that the first class generally matures in less than forty-eight hours, though he points out one case in which there is a complete cycle of only twenty-four hours. Two or three hours after the first attack Canalis notes small, spherical, ameboid organisms in the red corpuscles. About the periphery is a clear rim of ectoplasm surrounding a more shaded endoplasm which resembles a nu leus. This endoplasm at times is fragmented, resembling several nuclei. As the organism grows it becomes more active, when there appears in the periphery fine dark red or black pigment granules. As the organism reaches the adult stage the pigment gathers in the center in the form of a densely packed clump, and segmentation occurs as observed by Golgi in quartan ague. This form differs from the other forms in that it decolorizes the corpuscle even less than the quartan, contains rarely more than six granules of pigment and divides into only five or six segments.

The second or slow cycle of Canalis takes from three to five days to complete its development. It is rarely found in combination with the first, and when this does happen it is after the latter has been unsuccessfully treated. Canalis says that this form begins very much as does the first, but soon the organism assumes an elliptical form and pigment collects in the center. This gradually takes on a cresentic form, decolorizes the corpuscle and at times shows presence of double contour, thus giving evidence of a surrounding mem-

brane. These crescentic forms are seen to assume ovoid or crescentic forms, though the organism in some instances passes directly from the hyaline form into the adult spherical form without passing through the intermediate cresentic stage. Canalis states that he has noted the segmentation of crescents. In this he is upheld by Antolisei and Angelini. The pigment of these forms is non-motile, arranged concentrically in a closely packed clump, crown or wreath. He describes sporulation as taking place in the spherical stage. During sporulation the ectoplasm breaks up into from eight to ten spherules. These spherules are small and resemble the hyaline forms of the first cycle. On rupture of the organism its contents are thrown into the blood stream, the pigment granules being scattered through the plasma separately or in a clump surrounded by a membrane. Canalis notes that paroxysms occur during this process and accordingly calls it true sporulation.

Canalis differentiates between the process of sporulation and degeneration in the following points:

1. In the degenerating organism, there is no color, the ashy yellow tinge being replaced by a colorless highly refractive body.

2. The degenerate organism shows spherules, varying in size which may on close and continued observation be seen to coalesce. Thus all the spherules in an organism may unite into one. In sporulation the spores are equal in size.

3. The sporulating organism has a clearly defined double contour while the spherules of degeneration never do.

4. Degenerating forms are found in apyrexia and their appearance does not precede the presence of hyaline forms in the red corpuscles as in the case of sporulation.

Canalis demonstrates the presence of flagellate bodies in many cases of the second cycle. In every instance he finds them in the spherical, adult form of the parasite shortly before the paroxysm. From this fact he comes to the conclusion that flagellation is one of the last stages in the development of the organism.

Experiments of Marchiafava and Celli corroborate in a great measure those made by Canalis. They account for the prolonged and irregular paroxysms, not from the fact that there may be a large group of organisms which on segmenting cause this condition, but from the irregularity in the length of the cycles of different organisms. Thus, at certain times groups of organisms may segment one after the other. This, they contend, accounts for the continuous fever, the chill being covered up by the preceding pyretic stage. They conclude that the crescent is associated with pernicious forms. They cite grave cases where the crescents could not be demonstrated and also cases where this organism is present but no temperature exists. The latter phenomenon they do not attempt to explain.

These gentlemen, Marchiafava and Celli, describe the organism practically as does Canalis, noting the fact that pigment is small in quantity and appears very suddenly before the paroxysm. They state that in some instances they have seen organisms pursue the whole course of their existence without the development of any pigment. In this they are upheld by Antolisei and Angelini. They note also that the coloring matter of the corpuscle seems to collect about the periphery of the organism, being itself early decolorized at its own periphery. This coloring matter they describe as taking on a peculiar brassy hue. They claim to have found many instances where the corpuscle was greatly crenated even when the organism was still in its hyaline form. In a few cases they were able to demonstrate segmentation in the circulating blood, but always found it in the internal organs and in severe cases in the capillaries of the brain. These investigators recognize the crescents but are not able to corroborate the observations of others as to its segmentation. They believe that the degenerative changes are present.

As a result of these investigations Marchiafava and Celli in common with Canalis claim the existence of a new type of material organism, characterized by an irregular length of cycle, hyaline, crescentic and spherical stages associated with a continued pernicious and irregular course occurring chiefly in the summer and fall and unamenable to treatment. On account of the time of appearance of this type they have termed it the "estivo-autumnal type."

Marchiafava and Bignami later made interesting observations in regard to the estivo-autumnal type. They note as does Canalis two types of parasites which they term "quotidian" and "tertian or malignant." They describe the "quotidian" as consisting primarily of a small, ring-like hyaline body seen in the red corpuscle. The organism completing its cycle in twenty-four hours and undergoing segmentation with the development of little or no pigment, closely resembles the first cycle of Canalis.

The second form of Marchiafava and Bignami, in the commencement of its cycle, appears much the same as the quotidian but takes about forty-eight hours for development, always exhibiting pigment and at times associated with crescents.

In both types few organisms are found in the circulating blood but are abundant in the internal organs. Also in both types the corpuscle is shrunken and of a brassy hue and segmentation takes place while the corpuscle is yet intact. The tertian organism is much larger than the quotidian; segmentation is observed earlier and there is greater activity in the former than in the latter.

These forms differ from the ordinary spring quotidian and tertian forms, in that they are much smaller; present ring-shape hyaline forms; contain much less pigment which is practically inactive; divide into fewer segments; shrink instead of distend the corpuscle—which turns to a brassy hue; and show the presence of crescents, which are never seen in the ordinary tertain forms.

As to the peculiar paroxysms caused by these organisms the theories of Marchiafava and Bignami are, to say the least, unique. They account for those types of estivo-autumnal fever in which the paroxsyms are quotidian in character as caused by the first described organism. The fact of irregularity is explained by a tendency toward retardation and anticipation of the organism in segmenting. Thus they explain the almost continuous fever and the fever which borders upon the tertian form. In like manner they explain the irregularity of the tertian form associated with which are more severe constitutional symptoms and the presence of crescenst.

The observations of Golgi in Rome in regard to the æstivo-autumnal fevers go to disprove the observations of Marchiafava and Bignami. Golgi asserts that the pathologic process is not understood and that

the classification of Marchiafava and Bignami is entirely hypothetical. He finally concludes that the presence of the organism in the blood is more accidental than a direct cause of the disease. He states as highly probable that the observed organisms are the beginnings of cycles, the length of which is at present little understood. Golgi notes three stages of development: The first, an ameboid non-pigmented hyaline body seen in circulating blood. The second stage consists of small or large pigmented presegmenting bodies found in the internal organs. The third stage consists of segmenting bodies. He describes three forms of segmentation. The first is similar to that seen in quartan and the ordinary forms, differing in that there may be as many as fifty segments. In the second form the segments do not number more than eight or ten. In the third form the organism varies from one-third the size of a red corpuscle to even larger than the corpuscle. Segmentation in this latter instance takes place in the form of an irregular mulberry mass which surrounds the centrally located pigment. Golgi is of the opinion that these organisms are often found in phagocytes, in which they grow, segment and reproduce.

In summing up his observations regarding malarial fevers, Golgi gives to the world the following classification:

1. Fevers the cause of which lies in the existence in the blood of parasites whose habitat is principally in the circulating blood: *a*, the tertian parasite; *b*, the quartan parasite.

2. Fevers the cause of which lies in the existence in the blood of parasites whose habitat is principally in the bone-marrow and spleen. The parasite in this group he confesses his inability to classify completely and refers to the crescents as "forms the biology of which has not yet been well determined."

As a result of the investigations of other men we have many and various classifications of the organism. An ingenious classification is proposed by Grassi and Felletti, who give five separate types:

1. Hæmamœba præcox, a quotidian type with tendency toward anticipation.

2. Hæmamœba immacula, a similar organism, but more rapid and generally non-pigmented.

3. Hæmamœba vivax, the organism giving rise to tertian fever.

4. Hæmamœba, the organism of quartan fever.

5. Laverania malariæ, giving rise to irregular fevers.

These observers are confident that their classification is the same as the quotidian type of the æstivo-autumnal classification of Marchiafava, and agree with Canalis, Golgi, Antolisei and Angelini that segmentation may occur in the cresentic forms.

Sacharoff describes a parasite found in irregular forms which corresponds to the æstivo-autumnal parasite of Marchiafava, except that it is more frequently found in the circulating blood. He gives the following classification:

1. Hæmamœba præcox (Gra.).
2. Laverania (Gra.).
3. Hæmamœba febris tertianæ (Gol.).
4. Hæmamœba febris quartanæ (Gol.).

Later Mannaberg after extensive study of the parasite, gives the following classification which he claims to have vindicated.

1. Malarial parasites with sporulation without syzygia: *a*, quartan parasite; *b*, tertian parasite.

2. Malarial parasites with sporulation and syzygia: *a*, pigmented quotidian parasite; *b*, non-pigmented quotidian parasite; *c*, malignant tertian parasite.

The last and perhaps the most complete study of the organism of malaria has been made by men of our own country, Thayer and Hewetson of Johns Hopkins University, Baltimore. Their investigations divide the organism into three classes:

1. Tertian.
2. Quartan.
3. Estivo-autumnal.

With the exception of one investigator no one has been able as yet to cultivate the plasmodium malariæ upon medium used in the culture of bacteria. This one, Coronado, claims that he has cultivated the parasite in water taken from a source whence many persons had contracted the disease. He claims, moreover, to thus have traced the entire development of the organism. He claims also to have seen the development of the flagella from the pigmented forms which becoming free broke into from ten to fifteen parts, which began anew the cycle of the organism's existence. These experiments, however, we can not accept as facts, as many other competent and distinguished men have been unable to obtain like results.

Positive results, however, have been obtained in attempts to preserve the activity of the organism outside of the body. Sacharoff succeeded in preserving the estivo-autumnal organism for seven days by means of the use of ice. The parasite at this time retained its ameboid movements and staining qualities. In the case of the tertian parasite, at the end of forty-eight hours all the adult forms had disappeared, only the hyaline bodies remaining.

Inoculation experiments have been successfully made. Gerhardt was the first to show that malarial fever could be produced by inoculation. In two cases he produced quotidian paroxysms by infusing blood from a patient suffering from this form of the disease. The stages of incubation were respectively six and sixteen days. Later Marchiafava and Celli, and Manotti and Ciarrochi made successful inoculations. In each case they found in the blood of the inoculated persons the same form of the organism as was present in the blood of the patient from whom the inoculation organisms were taken. The time of incubation was from eight to fourteen days.

Gualdi and Antolisei made inoculations from the blood of patients suffering with quartan fever, and obtained the estivo-autumnal form. From this they claim to have proved their theory that different types of the organism are not associated with different clinical manifestations. However, it was later proven that the patient from whom the blood had been taken had but shortly before the inoculation suffered from estivo-autumnal fever. The existence of the estivo-autumnal type in the inoculated person is explained by the theory that the latest estivo-autumnal organisms reaching at this time their development, overpowered the quartan parasites.

This experiment leads to interesting observations made by Di Mattei, who injected the blood of a patient suffering with quartan fever into one suffering from estivo-autumnal fever. In sixteen days there was no evidence of the existence of the estivo-autumnal parasite, none but quartan being present. He also inoculated a patient suffering with quartan fever with the estivo-autumnal organism. In ten days the quartan had disappeared, being replaced by the organism of the estivo-autumnal type.

Calandruccio, who had never suffered from malaria, successfully inoculated himself with the tertian organism. In the case of other patients he obtained positive results from inoculations of estivo-autumnal organisms.

Bein in his experiments found that he often obtained by inoculation from a quartan fever one of the tertian type, and also from the tertian the quotidian type.

From the above experiments we may draw the following conclusions:

1. The plasmodium malariæ can be transmitted by inoculation.

2. The same type of organism is always obtained.

3. The average length of the period of incubation is from eleven to twelve days.

4. When more than one type of organism is present at the same time, the symptoms are produced by one variety alone, the growth of this type being associated with the disappearance of the other.

In the preceding digest of the works of the most prominent men engaged in the study of the parasite of malaria, the writer has endeavored to give some idea of the theories which have thus far been given to the scientific and medical world. At times these theories are in harmony, but perhaps oftener are opposed to one another.

It will be the object of the writer to separate from this chaos those theories which he has been able to establish through his own personal research. He will also aim, as far as possible, to set forth those theories which he has been unable to attempt to corroborate, but which have been accepted by the most competent investigators of to-day.

(To be continued.)

HOW MUCH PHARMACY SHOULD BE TAUGHT IN MEDICAL COLLEGES?

Read in the Section on Materia Medica, Pharmacy and Therapeutics, at the Forty-Seventh Annual Meeting of the American Medical Association at Atlanta, Georgia, May 5 8, 1896.

BY G. WALTER BARR, M.D.

Professor of Materia Medica, Therapeutics, etc., in the College of Physicians and Surgeons, Keokuk, Iowa; Physician to Mercy Hospital; Member Illinois State Pharmaceutical Association, etc.

QUINCY, ILL.

Notwithstanding modern tendencies, the main question is not how long the college course, but what and how well it is taught. The real value a student gets out of his college life depends upon the curriculum and the thoroughness with which things are learned, not upon how much of one thing he learns. The balancing of the curriculum is the most neglected as well as the most important consideration occupying the attention of faculties. Too often that professor who is most energetic in his college work has the most of the students' time, and the laziest professor is seen least at the college. Some colleges in America turn out pathologists, some surgeons, others chemists, and a few dermatologists, the graduates in each case being weak in other equally important departments of medical knowledge.

Again, each chair should lay out its work according to a definite plan in which each part receives exactly the proper emphasis, so as to teach the most valuable things pertaining to that department in the time allotted it; the surgeon should not teach the pathology of tumors completely and say little about fractures and dislocations; nor should the chair of materia medica teach botany to twice the extent of physiologic action. That these truisms, so axiomatic when formulated, really need to be called to the attention of many teachers is proven by the work actually being done in colleges which are rightly considered first class institutions of medical learning. While they deserve extended consideration, they are stated here simply to logically lead up to the question which touches the interests of every medical man and is the title of this paper.

Whether the course be two or twelve years long, the chair of materia medica and therapeutics can not cover the whole field of accepted knowledge in its department of science, because the bacteriologists, the dyeworks, the African savages and the psychologists are all combined to furnish grist for the mill far beyond its capacity to utilize. The teacher must first separate the wheat from the overwhelming mass of chaff, and then again choose those grains which will afford the most valuable pabulum to his students. The need of these students is something to enable them to practice medicine scientifically, safely and esthetically. Pharmacy is an ingredient of each and all of these requisites.

Scientific medicine requires training in and the practice of great accuracy. Pharmacy conduces to this by its very character. The number of prescriptions written so as to be chemically or pharmaceutically incompatible should be no greater than the number containing mistakes in therapy or indicating errors in diagnosis. It is just as discordant to the cultured ear to hear a reference to green iodid of mercury, to have the fluid extract and the extract of nux vomica spoken of as two entirely different drugs as regards their dynamism, or to be informed about the tincture of pilocarpin, as it is repugnant to the educated mind to read of Bright's disease, surgery without anesthetics, or the humor pathology of boils. In both cases it is not merely the nomenclature which excites our derision, but the lack of real knowledge back of the terms used, as evidenced by the language itself. The physician who makes a diagnosis of Bright's disease and bases his therapeutics thereon is not giving the patient the advantage of the common scientific knowledge of the day; and neither is the physician who prescribes fluid extract of pilocarpus when pilocarpin is needed. It is not true that all of the galenical preparations of a given drug always have the same dynamic action; to know when differences arise in the action of different official preparations requires a knowledge of pharmacy, and not to know is to be unscientific in one's therapeutics. A widely diffused knowledge of pharmacy within our profession would at once cause the death from financial starvation of most of the proprietary medicines which now have almost as large a sale to physicians as their predecessors in the patent medicine field had to the laity thirty years ago. That this is equivalent to an immense increase in scientific therapeutics goes without saying.

The element of safety in prescribing and dispensing touches pharmacy at several points. Incompatibility with dangerous results is perhaps the least important. The difference between the intentions of the physician and the actual administration of the medicine at once suggests itself. The basic function of the Pharmacopeia and the National Formulary is to attain uniformity of definition of drugs and their combinations, so that the patient shall receive from the pharmacist exactly what the physician had in mind when

the prescription was written. Very much of the dissatisfaction with the work of the pharmacist comes from the physician writing for one thing and the pharmacist putting up what the scientific world has agreed should be so denominated, while the physician had in mind quite another thing as the definition of the noun he used. In the cases—which the writer believes to be comparatively rare—where there is actual dishonesty upon the part of the pharmacist, a comparatively slight knowledge of pharmacy would detect the fraud and conduce to the safety of the patient.

The question of esthetics in the administration of medicines has practically been decided by compulsion from the patients. We were forced to meet the homeopaths on their own ground some time ago in this respect. But there is a higher motive in palatable prescribing than to please the patient. Palatable prescriptions are taken more regularly, the exact dosage is maintained better, and the psychic effect is not to be ignored. None of these advantages can be attained without a knowledge of pharmacy unless we fly into the arms of the patent medicine purveyors to the profession.

What has been said about prescribers applies with even greater force to those physicians who dispense their own prescriptions. The pharmacist notes the error in the written prescription and telephones the doctor, who insists that there is no error and orders the prescription changed. The dispensing physician has not the advantage of this proofreader. The physician who writes prescriptions ignorantly receives the punishment himself in the contempt of the pharmacist who fills them; the dispenser, ignorant of the pharmacal art he is practicing, causes the innocent patient to suffer the effect of his pharmaceutical mistakes.

Admitting the value of pharmacal knowledge to the practicing physician, the question of how much he is to be taught must have due regard to the time that can be allotted to the subject in the college which teaches him. The teaching of pharmacology should come at the beginning of the course in materia medica. The experience of the writer, harmonized with his opinions above set forth, is that the subject should be given a full year. This means that the freshman year should be devoted in this department to pharmacology; the time may be shortened enough to admit teaching the methods and times of administering medicines in the same year. The second and third years may be then devoted to dynamic action and therapeutics; three years of a four-year course is all that the chair should be allotted in the curriculum.

Not much pharmacy, comparatively speaking, can be taught in the hours allotted to one chair for one year; but it is approximately enough for the physician; it should be apparent that the latter does not need so much as the professional pharmacist. The next consideration is, what part of pharmaceutic knowledge is most important to the physician and should be taught him. The opinion of the writer is expressed in the following syllabus:

Definition of various general terms; definition and description (with history) of the United States Pharmacopeia and National Formulary; valuable unofficial drugs, and why not admitted; the relation of proprietary preparations to scientific medicine; when they may be rationally used; nomenclature; the classification of the pharmacopeia, including definition, modes of preparation, and peculiarities of each class of preparations, beginning with crude drugs, every detail being actually performed by the student in the laboratory assumed to be attached to the chair under a competent demonstrator; posology; prescriptions, the construction of; chemic and pharmaceutic incompatibility; esthetic prescribing (all illustrated by the student's own work in the laboratory).

This schedule does not trespass upon the domain of the chair of chemistry, and in actual application has given excellent results. Students who return as experienced practitioners express a high opinion of its value to the physician, and not one complains that the time could have been devoted better to other things. The one drawback to it has been the absence of adequate textbooks, the latter being either too elementary or else too complete in their pharmacology. It is a disadvantage to render necessary even one more textbook for the modern student. The works on materia medica and therapeutics, except Potter's textbook, slight the subject under consideration as a rule. There has lately been issued a textbook upon pharmacy which is really more than its title implies.[1] It is really such a comprehensive treatise upon medical chemistry, that many professors of chemistry will be very willing to adopt it as a text for that department, while it leaves little to be desired as a textbook correlative to the work under the chair of materia medica outlined above; its double use in this way will obviate the most serious defect in the writer's plan with which he has had to contend.

The response to the expected inquiry as to why this paper was not presented to the American Medical College Association instead of to this section may as well be made in advance. It might as well be admitted that the curricula of colleges is largely dependent upon what the general profession demands. Hygiene and sanitation will not be given much attention in colleges, in spite of State boards and legislation, until the profession is more generally awakened to the importance of this subject; bacteriology is as a rule sufficiently taught because the profession realizes its importance in the modern practice of medicine; whatever the profession thinks is the proper amount of pharmacology needed by the practitioner, that much will be taught in the generality of colleges. The question, which is the title of this paper, is therefore brought directly to the power which will make the final decision in the matter.

THE TEACHING OF MATERIA MEDICA AND THERAPEUTICS IN RUSH MEDICAL COLLEGE.

Read in the Section on Materia Medica, Pharmacy and Therapeutics, at the Forty-seventh Annual Meeting of the American Medical Association, at Atlanta, Ga., May 5–8, 1896.

BY DANIEL R. BROWER, M.D.

PROFESSOR MENTAL DISEASES, MATERIA MEDICA AND THERAPEUTICS, RUSH MEDICAL COLLEGE.
CHICAGO.

The teaching of materia medica and therapeutics in Rush Medical College is done in a lecture room, recitation rooms and the laboratory of materia medica. I have associated with me in the work eight assistants; one is the director of the laboratory, one gives the didactic lectures in materia medica and the others, as instructors, hear the recitations and assist in the laboratory work.

[1] A Treatise on Pharmacy by Charles Caspari, Jr., Ph.G., Philadelphia, 1895.

The materia medica is taught in the second year of the college course (a four years' course), because it is necessary, in my judgment, that the student should have a freshman's knowledge of chemistry and physiology to enable him to do good work in this branch. As an introduction to the course one hour a week in the last half of the freshman year is devoted to a lecture on medical pharmacy, by I. A. Patton, M.D., the director of the laboratory.

The subject of materia medica is divided into twenty-eight topics, and one week given to each. The subject is introduced by two didactic lectures, one hour each, given by S. L. Weber, M.D. This is followed by two hours of laboratory work and this by one hour of recitation. Five hours a week are therefore given to each topic. The whole class attends the lectures in one of the lecture rooms.

The class is divided into sections of from forty to fifty students for the laboratory and recitation work. The instructor who conducts the recitation of the section, is the assistant to the demonstrator for that section in the laboratory work.

In the laboratory work each student is furnished with a manifold copy of his day's work. He has already had two hours of didactic teaching on the subject matter. He now examines the physical properties of the drugs, makes such tests as are desirable to determine purity and show incompatibilities; either makes a pharmaceutic preparation or compounds a prescription, and at each exercise either writes a prescription in both English and metric systems or criticises a prescription written by the demonstrator.

There are three examinations in course during the term on the didactic, recitation and laboratory work, and one week is given to each. The student's final average is made up from his general recitation and laboratory work, and these three examinations. The course in materia medica, therefore, consists of 140 hours' work in the college.

Materia Medica Laboratory.—During the course each student has examined over three hundred crude and finished drugs regarding their physical, chemic, pharmaceutic and medicinal properties. Twelve pharmaceutic preparations have been made during the course illustrating liquors, tinctures, wines, syrups, compound syrups, infusions, liniments, pills, ointments, etc. Thirty compound prescriptions have been written, corrected and returned. Twenty prescriptions have been compounded, illustrating most all kinds of prescription work. Three hundred or more tests of incompatibility have been made; calculation of dosage for prescriptions, of percentage solutions by weight and volume; comparison of apothecary and metric systems, etc. Desk room for sixty students to work at one time and cabinet space for 120 complete sets of apparatus is provided in the laboratory.

Therapeutics is taught by didactic lectures and laboratory work. The didactic course consists of sixty hours of work. The materia medica, as far as practicable, is grouped around the great functions of the body and their diseases. The course begins with those substances acting on the digestion, nutrition (tissue waste and repair), calorification; then are considered those acting on the nervous system, organs of circulation, sexual organs, alimentary canal, those acting on the various secretions. The therapeutics of the principal disease of each of the organs and functions is made the central feature of each lecture.

The laboratory course consists of twenty-two hours instruction, the first half of which is devoted to electro-therapeutic appliances, as follows: General physics of electricity and theories of battery construction; electrolysis, cataphoresis; physiologic action in general; catalysis, electro-diagnosis, cautery, electric light, faradic batteries and currents, static and alternating machines. These exercises are illustrated by the use of batteries, electric machines, etc. The students construct the batteries, if possible. The remainder of the course is given to massage, lavage, enemata, colonic flushing, preparing articles of diet for the sick, to pneumotherapy, blistering, cupping, leeching, wet packing and hypodermic medication. Throughout the course use is made of dispensary and hospital patients for the purpose of illustrating all possible points.

The class is divided into sections of twenty; to each is assigned an instructor and the demonstrator directs the whole. A special instructor, Miss Mabel Hayes, who is the teacher of cooking in the Illinois Training School for Nurses, gives the lessons in preparations of foods for the sick.

I am very sure that since the introduction of these two laboratory courses, our students go out better prepared in materia medica and more familiar with therapeutics than ever before. These laboratory courses are still in a developmental state, and I presume each year will witness a lengthening of the time given to this work, and a possible lessening of the time given to didactic teaching.

TUBERCLE ANTITOXIN OR ANTI-TUBERCULIN.

Read in the Section on Materia Medica, Pharmacy and Therapeutics at the Forty-seventh Annual Meeting of the American Medical Association, held at Atlanta, Ga., May 5–8, 1896.

BY PAUL PAQUIN, M.D.

ST. LOUIS, MO.

It is probably to Richet and Hericourt[1] that the principle of sero-therapy is due, because they were first in formulating it fairly in their researches on the micrococcus pyosepticus. All other investigations, due chiefly to the initiative of Behring, have confirmed the almost prophetic possibilities of the claims of these two investigators, particularly on the general activity of serum as a living microbicide power.

But it is not on its general antiseptic property that the therapeutic value of serum rests, for it is inconstant. It rests on a physiologic problem, long combated, viz.: phagocytosis, so clearly elucidated by Metchnikoff. The microbicide power of serum is unquestionable. It opposes the development of certain microörganisms, but it does not exercise the preponderant influence of serum in its specific application in disease. The prevention or cure of a microbic disease rests on acquired immunity, and, immunity even natural, is not conferred by the germicide property of the blood. As evidence of this fact, we have the dog, whose blood serum is not bactericide in presence of the bacillus of anthrax, and yet this animal is comparatively immune to this affection. On the other hand, the serum of the rabbit is bactericide in presence of this germ, and yet this animal is exceedingly susceptible to anthrax. A seemingly conclusive argument that the bactericide virtue of serum is not the basis of immunity, or of the special therapeutic properties it

[1] I acknowledge many thoughts to D'Achalme, Hericourt and others in preparing this article.

may possess, is the evidence that heat at 55 to 60 degrees C. destroys this power, without modifying the physical, chemic or therapeutic constitution of serum.

The efforts of Hankin, Büchner, Ogata, Josuhara to isolate the bactericide substance, or substances, from serum were negative, and to-day there are thinkers who associate it with the globulicide property, which is probably an inconstant but a more or less potent factor when it does exist.

The therapeutic property of serum has been designated by the name, antitoxic, which is, in my mind, an unfortunate selection, because it implies, or at least suggests to the mind of the practitioner, that serotherapy depends on the chemic neutralization or destruction of the microbic toxins. The general practitioner is usually a busy man and has but little time and few opportunities to investigate, minutely, the intricate understructure upon which organic therapy is being raised. He almost necessarily arrives at conclusions on the significance of the words and language of the reports of scientists and bases his application of the remedies thereon. As a consequence, numerous practitioners think that the antitoxin of diphtheria kills the germs in the body very much as bichlorid of mercury would kill them in a beef broth culture, and destroys their toxins by some direct chemic action.

No one yet knows the nature of the actual element underlying the antitoxic power. Notwithstanding their splendid work, neither Tizzoni, Aronson, nor Hammersten have demonstrated that they have obtained it in purity. But very practical deductions have resulted from the remarkable achievements of Kitasato in sero-therapy of tetanus; of Behring and and Roux in diphtheria, and it seems that we can not disassociate the antitoxic power, so-called, of therapeutic serum from what is termed its immunizing property.

Metchnikoff has made very convincing researches on the fundamental questions involved in the problem of immunity. Among other things he has demonstrated that rabbits, vaccinated against hog cholera, produce a serum which is both preventive and curative in new subjects. And yet this same serum was found to possess neither a bactericide nor an antitoxic property of the nature that is said to exist in diphtheria antitoxin. The influence of *this* therapeutic serum at least was not directly on the germs or their products. And even diphtheria antitoxin, which was supposed to act directly on the toxins and their creators, because of the apparent loss of vitality of the latter when mixed with the former before their injection into the system of experiment animals acts indirectly after the treatment. It certainly does not destroy the germs for they are often found in their virulence in the mouth of recovered cases, weeks after the last injection of antitoxin.

It is then to nature herself that we must look for the explanation of the questions involved in the action of serum in therapeutics. A necessary factor is the natural forces of the organism experimented with or treated against a microbic disease. Men or beasts sometimes recover from a usually fatal germ disease, such as diphtheria, smallpox, tuberculosis even. What produces the cure? Nature's elements to arrest the development of the germ and antagonize the effects of their poisons. What are the forces producing these elements? The phagocytes. They are the chief defenders of the body, both in a physical sense and a restricted chemic manner, for the germs are antagonized in their development by the phagocytes, and their toxins are antagonized in their nocive power, probably by a cellular diastase.

Anti-tubercle serum is, like any other antitoxin, the product of nature to antagonize the encroachments of germ life in the system. It is produced by the organism subjected to a continuous, progressive system of saturation of the economy with the toxins of the bacilli of Koch, especially to antagonize the parasitic life of this germ. It is the defensive power which fights its advancement, step by step. Occasionally, a case of tuberculosis recovers without medical assistance. This is due to natural properties within the economy, the defensive and defense-producing forces, assisted or not by the action of outside influences, such as climate, nourishment, etc. The production of tuberculous antitoxin is due to the action of tuberculin, the germ poison in the body. Tuberculin irritates the cells; the cells retaliate by augmenting the power of the phagocytes. In other words, the action of tuberculin in a susceptible organism, consists of a reaction, more or less severe, if administered in more or less heavy doses. During this reaction, nature produces the antitoxin in the blood. Then this antitoxin or the anti-tubercle serum, or anti-tuberclin, is filtered out and used in man by hypodermic injections, thus infusing into his blood the very antagonist which nature creates or exalts in power to arrest tuberculosis.

The theory is beautiful; the facts are demonstrated.

Bertin, Picq, Maragliano, Behring, Foa, have all experimented with naturally or artificially immune serum in the treatment of tuberculosis and the last three scientists have obtained favorable results in man and beast. It was in our country, however, that the horse was first immunized against tuberculosis and his serum used successfully on a large scale against all forms of tuberculosis. The serum produced in my laboratories is the result of several years of investigation of tuberculosis in man and beast, at the State University of Missouri, and subsequently, in private and in the special institution under my control. It consists of clear amber serum of horses having undergone the process of immunization from three to six months, the usual time to reach a non-reactionary point, by daily injections of tubercle toxins, from liquid beef cultures, at the progressive dose of 2 c.c. to 20 c.c. daily. The toxins of the germ cells, themselves, dessicated, may be used also to increase the intensity of the immunity, when the toxins cease to react before three months of injections.

The horses are always kept under observation several weeks and then examined, and tested for glanders before subjecting them to the injections of toxin for immunization. Consequently, no danger exists of transmitting animal diseases, or disease toxins of the horse to man. Furthermore, our system of filtration precludes the possibility of any germ remaining in the serum if any should be present when the blood is withdrawn from the animal.

The physiologic effects of serum, some of which are undesirable, are well known. Any serum, immunized or not, may produce erythema, urticaria, articular pains and swellings, oligocythemia, oligochromemia, local cellulitis, swelling, etc., without being in the least impure from a bacterial standpoint.

Certain elements in the serum, none of which have yet been isolated, are more or less poisonous and pro-

duce various kinds of intoxication, with varying symptoms and pathologic phenomena. Some exhibit symptoms of nervous disturbance; others of interference, more or less pronounced, of the circulatory system. Again, there sometimes occurs in protracted treatment a curious, sudden flushing of the face, apparently due to a disturbance of the vasomotor system. All of these untoward effects are usually mild and ephemeral and none of them militate against the use of serum, although sometimes, in refractory cases, one must use it very cautiously, in very small doses at first, and even substitute rectal injections for hypodermic medications.

All the efforts made so far, abroad and in our laboratory, to establish a precise and constant mode of measurement of the antitoxic or therapeutic neutralizing power of anti-tubercle serum, have failed to produce results reliable enough to constitute a sound basis of estimation. The Behring law can not as yet be applied with assurance. The effects of anti-tubercle serum in man or beast vary according to the stage and nature of the affection, the amount of special or general tuberculous intoxication, the microbic mixtures in the diseased organs, and the nature and progress of the lesions. So far, the estimation of the tubercle antitoxin is based chiefly on the neutralizing influence of a given quantity of it mixed with a given quantity of tubercle of a given strength, the mixture being afterward injected in small animals and results noted. But the fact that these small animals have different powers of resistance to tuberculin vitiates the system. So far, the best gauge we have to determine the value of anti-tubercle serum is our experience with the results obtained with a certain class of horses, immunized three to six months, with a progressively declining reaction until it is *nil*, and our results in our clinics in tuberculous patients and in our laboratory in experiment animals.

Paquin's anti-tubercle serum is absolutely free from microbes. It is put up in small vials of one-half ounce, labeled with date of production and test. Dose, 10 to 60 drops, hypodermically, every day or alternate days. As much as 120 to 240 drops have been administered, repeatedly, in successive days in special cases, with good results. Per rectum, 30 to 240 drops daily, may be safely given. The results by this method are not yet sustained by many reports, but there seems to be no doubt that rectal injections of antitoxin result in perfect absorption. Dr. Chantemesse of the Pasteur Institute, Paris states that diphtheria is as readily controlled by rectal injections of antitoxin or by hypodermic exhibitions and some other antitoxins make similar reports.

DISCUSSION.

PROF. EDWIN KLEBS—There is quite a new and astonishing development of interest in internal pathology in consequence of the now generally adopted theory of the bacterial nature of all infectious diseases; the idea to search for bacterial remedies has originated and fixed itself in the minds of physicians and also become popular with the laity. We will find in no other way a sure weapon against these destructive inhabitants if a certain pathological process is nothing more than a combat between the human organism and certain microbes vegetating in the body. The surgeon has profited more by these researches than the physician by the possibility of asepsis or preventing the introduction of the germs in the operations on the body. We, the physicians, find the microbes established in the body, often for a very long time. In chronic diseases such as tuberculosis there exists moreover a sort of symbiosis between the two organisms, in which the forces of the germs and of the human body are more or less counterbalanced. An old phthisical patient may live long, seeing his wives and all his offspring die before he pays his duty to nature. That is no mere latent disease, but an actual affection, poisonous to others, but not poisonous for its own body. We say in such cases that the human organism is immunized against the germs that have taken possession of it. I remember some of our best writers, as Schiller and Stevenson, living and working wonderfully under such conditions. Women have gained under the influence of the more or less latent disease oftentimes, an unsurpassed lovliness, often celebrated by poets and highly esteemed by high minded men.

We observe many peculiar features of the disease, and standing for long years, not at all offensive. I have seen lately the case of a celebrated botanist, the disease latent for fifty years, whose long career has been an uninterrupted chain of good deeds.

All these remarks are pointing somewhat to the not yet written psychology of tuberculosis, one of the most interesting chapters of human biology. They will show that my long contested thesis of self-immunization in this disease is proved by daily observation as well as by animal experiments.

This fact opens a broad field for possibilities of healing, but also renders the task of the physician difficult, as such persons do not always realize their abnormal condition or are not willing to acknowledge it. Such patients fill all health resorts, and not always living as they should when there.

If we ask the conscientious physician what are the effects of climatic or general treatment, he will concede probably that they have more of a retarding than a healing influence.

The question will arise: Can we do more for these patients? I am quite sure that the bacterio-therapy of tuberculosis will afford us better methods.

The first principle of this therapeusis must be contained in the demonstrated possibility of killing the germs in the body; the second in the not quite solved question of immunizing the organism and of antagonizing the toxic effects of the germs. The one problem does not exclude the other, but in chronic diseases the first principle is of far greater importance than the second.

Dr. Paquin, searching to solve the second problem, as Viquerat before him, has given us some good results of the serum treatment, which I do not think are at all doubtful; but to establish the fact in a scientific manner, clinical cases alone are not sufficient. Every new treatment shows quite a number of healed or improved cases. In man it is not possible to find enough comparable cases, and the final effect can not be ascertained in an unquestionable manner. Such thesis must be proved by animal experiments, in which we can use absolutely normal animals for infection and treatment; whether we have attained our object or not the postmortem will show. I have endeavored to fulfill this task in a great number of experiments with tubercle serum, taking daily temperatures and weights through many months, but I could not effect the cure of one animal, although the infection was slight and the doses of tubercle serum large. Nevertheless, I do not say that there will be no antitoxic effect from this treatment; but unfortunately this point is not sufficiently cleared up.

On the contrary, with germ-killing substances, prepared from the tubercle-cultures I had far better healing results in animal tuberculosis. I may say that they have given me the only perceptible results.

In the guinea pig, the animal most susceptible to tuberculous infection, the greatest deposits are found in the liver and spleen. The two organs are swollen enormously and filled with yellow tuberculous matter. Even such large deposits can be healed by bacterial products. The liver shows deep fibrous scars without any tuberculous deposit, otherwise quite normal except a

little hypertrophic tissue. The spleen can be reduced to nearly normal size except always a little hypertrophy in consequence of the cirrhosis of liver, but it is quite free from tuberculous tissue and tuberculous bacilli, as also are the other organs. Such results can be obtained in three or four months treatment, whereas the control-animal, infected with the same quantity of tuberculous bacilli, without treatment died in two or three weeks.

These results are now confirmed by a long and careful clinic observation I had in Europe. In 72 cases 70 (93 per cent.) healed or were very much improved; Dr. von Ruck reports in 182 cases treated in the Winyah Sanitarium 59 (32.4 per cent.) apparently recovered cases, 56 (30.8 per cent.) greatly improved, 29 (16 per cent.) improved. *Therap. Gazette*, 1896, No. 5. That other physicians had similar results, is stated in many published observations, also indicated by the extensive use of antiphthisin in the last year, amounting to more than 50 liters of 1 per cent. organic matter.

I have devoted myself in the last year especially to a renewed study of the healing and immunizing properties of the different compounds of the tubercle cultures. I found that my first preparation, tuberculocidin (The causal treatment of tuberculosis, 1894) has an immunizing power, in a higher degree than antiphthisin,[2] the same as with tuberculin.

The immunizing power is conveyed to this preparation by certain substances contained in the bacilli, whereas antiphthisin is only prepared from the culture fluid. As the latter is the mildest form of tubercle-killing substance from tubercle culture, I think it best to commence the treatment with antiphthisin and later, if there is no fever, use the tuberculocidin. As the latter is more liable to produce fever than is the former, it must be given in smaller doses, from 0.1 to 1.0 c.c., and also more cautiously. The most successful cases that I have seen, were treated in this mixed manner. (I regret that Dr. von Ruck in his publication does not give separately the cases treated with antiphthisin alone, and antiphthisin and tuberculin, but I hope he will later report these cases separately and in a more detailed manner.)

ATTENTION, AN ADJUVANT IN THERAPEUSIS.

Read in the Section on Materia Medica, Pharmacy and Therapeutics, at the Forty-seventh Annual Meeting of the American Medical Association, held at Atlanta, Ga., May 5-8, 1896.

BY GEO. V. I. BROWN, D.D.S., M.D., C.M.
DULUTH, MINNESOTA.

A careful scrutiny of the pathway along which has traveled to us, almost from the beginning of history, the knowledge of that state known variously as hypnotism, mesmerism, bradism, animal magnetism, electro-biology, etc., on through an almost interminable list of isms, ics and ologies, brought forward from time to time by its many champions, now bright with the brilliance of popular excitement and approval, again darkened with the severity of general condemnation, hailed as a universal deliverance from all the ills of mankind's heirdom, or crushed under the ban of responsibility for crime or direful mental injury, must, I think, convince most students that the answer of the scientific bodies of to-day can be but slightly different from that given by the Roi Medical Society and the French Academy of Sciences, at Paris in 1778, which, as everyone knows, was a refusal to accept the so-called truths en masse. Yet there is something about this subject that will not down, and even though the whole may be full of fallacies and fraught with danger, still there are facts concerning certain mental influences from which the therapeutist has no escape. They must and do influence his every effort, and the question at issue is simply: Shall he try to ignore them and trust to a haphazard effect, or will he guide and encourage this mental and nervous action, for the furtherance of that which his medical knowledge dictates to be beneficial?

After many years of study and experiment, I find my objection to the general use of hypnotism in no wise diminished. Out of the mouths and through the pens of its warmest supporters have come to me a confirmation of my feelings of distrust, and for some time past my efforts have been directed toward the accomplishment of possible usefulness in mental treatment, without the necessity of inducing the hypnotic state; hence this article, "Attention, an adjuvant in Therapeusis." Attention because it brings us nearer to the essential principle involved.

The one thing upon which all writers agree, irrespective of their other views, is, that without the attention of the subject hypnosis would be impossible, and it matters but little whether the attention be engaged with a flash of light, the sound of a gong, fixation of gaze, or words of command, by musical sounds, animal magnetism or any other manner, so long as the flight of thought be arrested and concentrated upon the desired object.

Suggestion would be useless without the attention of the subject, although suggestion is the most useful means of producing mental impressions. Adjuvant, because as a helper in coöperation with other well-established remedies, psycho-physics can be safe and useful, as it could not be in the light of a cure. The simple facts to which I desire to direct your attention are:

1. By a proper concentration, and the guidance of the subject's attention nearly everything beneficial can be accomplished that might be possible in the hypnotic state without hypnosis, and therefore without its dangers.

2. The loss of conciousness is not always necessary for anesthesia, or action upon any particular nerve centers, and the parts under their control.

3. Much valuable assistance can be given to other therapeutic measures in a great variety of ways, not alone by stimulating the beneficial effect, but also in the arrest and avoidance of antagonistic mental influence which so often aborts the intended value of other treatment.

A brief study of certain mental and physical phenomena will bear out as at least reasonable the proposition stated, and practical evidence brought forward in the cases cited will commend themselves to your consideration in support of the deductions advanced. We know that under quite natural conditions one can become so absorbed in a good book or in a certain line of thought that familiar sounds, ordinarily distinctly audible, will pass unheard. Yet there is no reason to suppose the auditory apparatus does not carry the vibrations to the brain in the usual manner, but no consciousness of the fact exists, because one portion of the brain is inactive while the other parts have perhaps unusual activity. This we recognize as a sub-conscious state.

Wm. Romaine Newbold suggests the term, dis-ordination, as the opposite of coördination, and says the fact that a mental state can exist dissociated from the others, and without a personal consciousness, leaves no room to doubt that many may be simultaneously

[2] Dr. von Ruck says in regard to this point, l.c.: The two preparations are practically identical and, so far as I have been able to observe, the therapeutic effects are the same.

dissociated, or even the entire mental system dissolved into a chaotic mass. That under these conditions there would be no memory, because memory is dependant upon association of ideas.

He describes hypnotism as a state of disordination produced by the subject being put to sleep with the sound of the operator's voice constantly in his ears, his being made aware of his presence by the sense of touch, or in some other manner, until all the elements of normal consciousness are disordinated and more or less extinguished, save the one group governed by the consciousness of the hypnotizer. That portion has had no opportunity to sleep, and naturally susceptibility to all other stimuli being lost, this one group acts with an accuracy impossible in the waking state. Epilepsy, shock, hysteria and trance state are all forms of disordination.

Disordination from shock has been remarkably illustrated in my own practice recently. A young lumberman, of good habits, was kicked in the face by a horse, his upper lip cut in the median line and the upper jaw fractured on both sides, including also the roof of the mouth. This occurred on Monday at about 7:30 P.M., and he has no recollection of anything that happened until the following Wednesday evening, when his lip was sutured without pain, though no anesthetic of any sort was used, and his first faint glimmer of a returning memory was a hazy recollection of the pins being stuck through his lip; but the remarkable part is that in this interval he had traveled fourteen miles in a sleigh and about one hundred miles (from Ely to Duluth) by rail, was able to walk about and attend to all his wants, and according to his friends' testimony, was quite rational, told about his case and answered all the questions correctly. No pain was felt until Thursday, when he became fully cognizant of all things about him; then his suffering was of course quite severe.

It is a matter of frequent notice that after unusual excitement of any nerve centers, as by study prolonged sufficiently to cause fatigue, the brain will continue to go over and over the particular line of thought, even though all the other portions of the brain are at rest, or a particular strain of music may reverberate in the same manner, in short, any impression that may have reached the brain may be repeated, perhaps in dreams, possibly in moments of sub-consciousness, but without any voluntary effort to start its cerebral elements. This condition, known as automatism, is noticeable in a variety of ways and certainly gives justification to the idea that the repetition of words intended to act upon certain centers to produce some particular effect must excite vibrations that will act automatically, and in time produce the desired effect. This, as I will endeavor to show, is precisely what does occur.

Professor Ladd of Yale University says of the mechanical theory of nerve conduction, that messages are transmitted by a series of wave motions, just as light, heat, electricity and sound, which may be accelerated or retarded by outward influences.

In certain moments of high nervous tension pain is intense, thoughts are transmitted quickly, all sensations are acute, in other words, the vibrations are more rapid, the pitch is higher, just as the tone of a tightened violin string. On the other hand, with nervous tension relaxed, all transmissions are less rapid, the human violin string is loosened. Upon these and kindred pecularities of brain and nervous action depend all methods of physical treatment of disease, and all of them are dependant upon attention in some form or other for existence.

John Hunter, in 1838, said: "I am confident I can fix my attention upon a part until I have a sensation in that part," and told how he prevented a magnetizer from affecting him by fixing his attention upon his big toe, moving it about constantly.

Of the influence of expectant attention, Carpenter says: "The contrast between the volitional and automatic states of attention is particularly well shown in the effects of painful impressions upon the nervous system. It is well known that such impressions as would ordinarily produce severe pain, may for a time be completely unfelt, through the exclusive direction of the attention elsewhere." Continuing, he says: "Now just as the organic impressions, which make themselves felt in pain when the sensorium is receptive of them, may exist without consciousness if the sensorium be otherwise engaged, so it may be affirmed, and on precisely the same evidence, that the organic changes which are concerned in the automatic production of thought, and of which we become conscious as ideas when the sensorium takes cognizance of them, may go on without consciousness if the sensorium be otherwise engaged."

Tuke says: "Attention may be definitely directed to the parts affected accompanied by the expectation of a certain result without the administration of drugs," and cites a large number of cures thus effected.

In further support of this theoretic superstructure, the authorities that one might cite are almost limitless. Ladd, Sully, Luys, Newbold and other investigators in mental physiology and psychology speak of these various attributes of the action of the brain and nervous system, and recite many peculiarities that have been strikingly brought to light, particularly as to cures effected by expectant attention and the imagination. As for records of hypnotism, the various faith and other cures, their funds of examples are inexhaustible, a fair proportion of which are unquestionably authentic, but for practical purposes, I shall confine my illustrations to just the things that have been accomplished within my own experience, and only such of these as will tend to show the subject in its various aspects of usefulness.

In a former paper, published in the *Chicago Dental Review*, I described some cases in which without other assistance I had reduced the temperature of patients suffering from febrile disorders, inducing restful slumber by stroking the head and extremities, as in gentle massage. One of these, a typhoid patient, whose life was dispaired of by the physician in charge, with the temperature taken just before and twenty minutes after treatment had been begun, showed a decline of three degrees, the restless tossing about had ceased and sleep came to her relief, which whenever she awoke was induced again, and so continued until morning. Nature, thus assisted, soon brought about entire recovery. A case of hysteria and another of dysmenorrhea, in which the symptoms were particularly distressing, were reported as having been successfully relieved in the same manner, and the painless performance of many minor operations in analgesia, produced by suggestion, were also referred to at the time, but I particularly called attention to the fact that under certain states of hypnotic influence, while operations can undoubtedly be painlessly performed, the danger of shock is much

greater, and more to be dreaded than under natural conditions, even though the suffering might be intense.

I am more than ever convinced of this fact and find myself less willing to try to put a patient into a condition where helpless to resist; there may yet be a susceptibility to shock, extremely aggravated by the disordered mental condition.

James R. Cook, M.D., thus describes his own sensations upon being hypnotised for the first time: When told by the operator: "You can not open your eyes," says, "I was conscious that while one part of my mind wanted to open my eyes another part did not want to, so I was in a paradoxical state." In my opinion patients are frequently in a paradoxical sate.

I was called by the present Secretary of this Section, Dr. W. B. Hill of Milwaukee, to take charge of one of his patients, a man of about 45 years, and at my request, Dr. Hill has written a description of the case, which is as follows:

"Mr. G., a stationary engineer, came to me during the fall of 1894, suffering from insomnia, anemia and general neurasthenia. Circulation was very poor, cold extremities, rapid and feeble heart, muscular twitchings and pricking sensations all over the body.

"Tonics and nerve sedatives were ordered, but patient could not bear any medication. Dr. G. V. I. Brown was called in the case with me and recommended massage, a suggestion which was carried out by him with marked benefit to the patient.

"An examination of the rectum revealed a large internal hemorrhoidal tumor about one and a half inches from the sphincter ani. I decided to operate by ligation and use cocain as a anesthetic. After all precautions were made, inadvertently, the cocain solution was spilled and I asked Dr. Brown to go to the patient's head. The operation was performed under hypnotic anesthesia produced by Dr. Brown, the patient experiencing absolutely no pain or discomfort either during the operation or the time the wound was sloughing off and granulating, but was given suggestions daily for several days thereafter. All symptoms of his former trouble disappeared, the patient feeling better and more vigorous than for some years.

"About two weeks (nine months later) there was a recurrence of the trouble to a slight degree; an examination showed another small tumor in the same region. I again operated, under the influence of cocain (Dr. Brown not being present), the operation was not without pain this time, although I had the same happy result as far as neurasthenia was concerned."

In addition to what Dr. Hill had kindly stated, I wish to give the following facts: The treatment given was general massage for fifteen minutes every evening at bed time, attention directed to the parts in which the circulatory process was most inefficient, with the purpose of augmenting and continuing for a longer time the effect of the increased blood supply, due to the rubbing. In the abdominal region he was massaged to cause peristaltic action and his attention directed to the part with instructions to have a passage one-half hour after breakfast. The massage concluded, he was made comfortable for the night, and a gentle stroking about the occiput and frontal region soon caused drowsiness. Over and over again were repeated, in a monotonous yet impressive manner, the words, "Sleep, sleep well, all night long. If you awaken, go right to sleep again; have a passage from your bowels half an hour after breakfast." Upon several occasions when he was particularly restless his gaze, with eyes upturned, was fixed upon my finger for three or four minutes to assist concentration of his thoughts, and twenty deep, full breaths were taken, but at no time was the process carried so far as to produce hypnosis; the sleep, when he fell asleep, was apparently a natural one. As strength returned active movements were prescribed, and the idea of self-help inculcated to arouse his will. In exactly seven days from the first treatment the patient returned to his work, having been unable to do so for some three months. His rest was regular, digestion improved, and every morning at the appointed hour he had an evacuation from his bowels, which was remarkable in view of the fact that for many months it had been his custom to give himself an enema for this purpose and all natural effort seemed to have ceased. Anesthesia was produced during the operation upon the rectum by having the patient hold my hands, instructions having been given to keep a strong pressure as possible in order to keep his thoughts fixed upon the effort, which we were successful in doing. Not only was he conscious all the time, but in no respect did he show himself to be influenced except in the desired absence of painful sensation.

Relief was given another patient who was suffering from intestinal catarrh and had severe pain at certain hours in the day. She was instructed to lie down at about the hour the pain was expected, close her eyes and take twenty long breaths, filling the lungs quite full and exhaling slowly. The centering of the mind upon the breathing after a little training put her to sleep so readily that she was seldom able to reach the twentieth breath. The nap gave rest and quiet to her nerves, beside tiding over the painful period. Mrs. A., about 28 years old, with a history of supra-orbital pain of an intense paroxysmal character, lasting for a few moments at a time and varying from ten minutes to four hours apart, ever since she was 8 years old, night and day. Four hours was the longest period of freedom of pain remembered, except upon two occasions; once, after an overdose of some drug, five hours' rest; and after a thirty-mile sleigh ride she slept five hours. Opiates had been taken constantly, sometimes in very large doses. All varieties of treatment had been tried, both in this country and in Germany. Resection of the supra-orbital branch of the trigeminus had given no relief, pain returning the moment the effect of the anesthetic had passed. The day I was called she had fallen upon the floor in a stupor from exhaustion. As a preliminary step, all drugs of whatever nature were prohibited, and after about two or three weeks daily treatment, intervals of five, six, seven, eight, nine, ten, and even fourteen hours without pain were not infrequent. General health and spirits were, of course, improved, and fairly undisturbed rest at night was the rule. Had not treatment been unavoidably interrupted there seems every reason to have expected much greater improvement; certainly any change for the better was the most severe test. The attention was guided, but not to a hypnotic state.

As to the exact manner of practical application but little can be said, save in a general way.

In my own experience, the individual peculiarities encountered require a great diversity of methods; particularly among the hysterical is there a latent perversity which sets itself against one's prime object, and

so it frequently happens that I use the word, sleep, quite sure that such a patient will not sleep, yet, with the mind centered upon not going to sleep, other suggestions incidentally brought forward are usually quite readily effective.

Concentration of gaze five minutes, followed by twenty full, rapid inhalations and exhalations are usually sufficient for operations that can be quickly performed, such as an opening of an abscess or extracting a tooth, but the breathing must be continued without stopping until the operation is finished.

For patients suffering from digestive disturbances, insomnia, tinnitus aurium (when aggravated by nervousness) or any affection for which it may be desirable to prescribe home treatment, the method of lying with the eyes closed and breathing as before described is by all means the best. Respiratory effort is of itself a beneficial exercise, easily understood and readily adopted by reason of its simplicity.

I have treated hypnotism as a disordinated state quite different from natural sleep, in which the subject is not open to suggestion and would awaken if suggestion were attempted, for, though denied by some, this distinction is well supported by eminent authorities, and accords fully with my own observations.

The objectionable features to hypnotism, Christian science and many methods of psycho-physics are:

To say nothing of the dangers of hypnotism as regards crime and physical injury, which, notwithstanding its repeated denial by ardent advocates, is still supported by a great amount of evidence. There is beyond question the fact that repeated hypnotization causes a dangerous susceptibility. Bernheim, Binet and Feret, Luys, Faveau, DuConormeilles, Hart, Cocke and many others all admit this fact, though some claim the danger can be avoided by suggestion; nevertheless, Hart took several of Luys' patients that had been given the usual suggestion not to let others hypnotize them, and in the presence of several reliable witnesses, induced the hypnotic state without difficulty; but assuming for the nonce, every physician to be equal to the harmless management of these difficulties from the point of view of the therapeutist, the essential and vital difference between the treatment here recommended and the hypnotic suggestion is, the one tends to build up, foster and encourage the will force and judgment of the patient, teaches self-reliance,and increases mental power. Whereas, the other weakens and destroys, in a measure at least, the inherent will power, takes away self-reliance and the valuable notion of personality. What physician, with the patient reduced to a mere automaton, subject to every word, every gesture, every look of the hypnotizer, can tell the exact physical state; when the patient, told that he is better, repeats; "Yes, I am better to-day," or marks any improvement that may be suggested to him, notwithstanding the fact that the disease may at the very moment be on the increase, with all the symptoms masked by his mental state.

Who is prepared to become "his brother's keeper," to say, "my mind is all right; I see and know all things clearly; I will be responsible for other minds and my own also?" Surely no one who has studied deeply into psycho-logical mysteries.

The so-called healers of Christian science, while they have done wonders in developing the field of mental treatment, deal in just this manner. Perhaps I speak a little bitterly, but I have in mind a friend of mine, who was buoyed up with the false hope and fancied improvement suggested by those charlatans, until a cancer had stolen its way so deeply into his vitals that at least a number of years of his life, that otherwise might have been spared him by correct early diagnosis and the knife, had been lost.

The one thing that retards progress is a tendency to deception, particularly in this connection. Records of psycho-physics abound with lists of cases in which the patients have been deceived in this or that manner, given bread pills and water instead of the expected remedies, etc., throughout the familiar tricks. Now, while this may be very interesting in the light of experiments, lying and deception make, to say the least, a very unstable foundation upon which to build a therapeutic structure.

I have tried to strip this subject so far as possible of odious associates, believing that if accepted at all by the medical profession and accorded the place I feel it ought to have among legitimate therapeutic measures, its advance must be in a strictly conservative manner, without mysticism, and viewed only in the light of natural mental science.

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THE PRACTICAL USES OF SUGGESTIVE THERAPEUTICS.

Read in the Section on Materia Medica, Pharmacy and Therapeutics, at the Forty-seventh Annual Meeting of the American Medical Association, at Atlanta, Ga., May 5-8, 1896.

BY WILLIAM LEE HOWARD, M.D.

BALTIMORE, MD.

I conceive it to be your desire to have a plain statement of the uses and limitations of suggestion, and I shall confine myself to this conception. To those of you who desire a more comprehensive statement of the psychologic side of the subject I refer to my paper read last year before the Neurologic Section of this ASSOCIATION.[1] In this paper I shall avoid as much as possible the misnomer hypnotism, as we shall see later on that often curative effects of suggestion are produced without inducing hypnosis. To anyone familiar with modern pathology the limitations of the therapeutic uses of suggestion will be readily understood. To those familiar with the trend of modern psychology its application for harmful effects will be fully appreciated. In treating patients by suggestion it is necessary to remember one fundamental factor, *i.e.*, the subjective state of the patients. Without this latter condition you will seldom succeed in effecting your object. Without doubt the reputation and success of most physicians is due to suggestion, often unconsciously made. The great factor in the large number of cases reported by Bernheim is

[1] Hypnotism, its Uses, Abuses and Medico-legal Relations. Jour. Am. Med. Asso., Nov. 30, 1895.

due to the explicit confidence in him by his patients. We all know what a difference it makes in our successful treatment of patients when they have unbounded confidence in us; how soon they will respond to our suggestion; where, with a stranger, or one in whom they have little faith, treatment has apparently but slight effect. The same medicine given the patients by the physician with whom they are *en rapport* will have a far greater effect than if given by a stranger, provided that the former makes some simple but forcible suggestions regarding the effect of such medicine. When we start at the fundamental facts of suggestion it all appears very simple. To illustrate the force of suggestion I will give you a simple example. Let A., B. and C. agree to meet D. at different times and places during the day. Let them be men in whom he has confidence. On his way down to his office D. meets A.; A. exclaims: "Look here, D., what's the matter with you? You look very ill." etc. This suggestion acts with sufficient force to cause D. to drop in to a public place and consult a mirror. He soon sees that his face is pale and begins to feel weak. He throws off the idea for a while, but it will return to him at intervals. He then meets B. whose suggestions are more forcibly made; and afterward the third party. By this time, D. is in reality psychically ill, goes to his home and sends for his physician, who will find a rapid pulse and a generally disturbed condition. This is a fact that I have often demonstrated. Now, suggestion can act reversely. Hypnotism in all its stages is now an undisputed fact. Suggestion is a justifiable method in certain cases. In those obstinate and disagreeable cases of hysteria in all its forms; in insomnia, drug habit, and immoral practices which so often disrupt once happy homes, we here have a therapeutic remedy; and any physician, who, after he has made a correct diagnosis and failed to cure after using all his other resources, refuses to use suggestion either with, or without the aid of hypnosis, is not giving his patient that care and attention that he has a right to expect.

Unfortunately, through the daily press the subject has been placed in such a light as to have caused its beneficial factors to have been forgotten, and the older practitioner, with little or no knowledge of modern physiologic psychology, has looked askance at the subject. About this branch of medicine there has been too much haste, inaccuracy, fallacious reasoning, confused or contradictory ideas by a large number of our profession. I will now give you the practical side of the subject, leaving speculation and theory strictly alone. If I appear dogmatic it is only because I quote the reports of the most eminent and reputable men of science; and have not gone beyond the deductions derived from experience. I shall give you only the digest of the subject as reported the last twelve months.

The practical uses of suggestion are numerous. In certain forms of functional disturbances cures can be effected. The pains that often accompany organic diseases can be abolished. While suggestion will have no effect on organic disturbances *per se*, the relief of the accompanying pain is of vast importance, as it gives comfort and rest to the patient. The sensation of pain takes place in the cerebral cortex; it is a mental condition, it implies consciousness and hence, by an alteration in our state of consciousness as is induced by suggestion, pain can be abolished. Several cases have been reported of the cure of organic diseases of the cord. It is only necessary to say that either the observers were mistaken in the diagnosis, or allowed their enthusiasm to warp their judgment. The internal capsule, the thalamus, the motor convolutions, the sensory tracts in the cord once destroyed are not to be restored by any form of interference. It would appear at first thought that any such self-evident fact mentioned here was superfluous; but from the large number of letters I receive from the profession I judge that this matter is not always understood.

I find, however, that I can greatly relieve a patient suffering from organic disease. The removal of anxiety, the implantation of new ideas, the removal of the habit of introspection, are oftentimes the means of breaking those vicious circles so common in the pathologic states, and removing the unpleasant psychic accompaniments. In my experience, insomnia offers the practitioner his best field for the treatment by suggestion. We can here see how it acts as a curative agent in so many functional disturbances. I generally see the patient at my office several times before attempting to produce hypnosis. After I have gained the confidence of the patient, and am satisfied as to the functional cause of the insomnia, I begin to suggest sleep. The symptoms of sleep are readily called up, they are familiar and natural, and therefore, a patient without possessing very great confidence in the operator can, without much difficulty, be made to believe that sleep has come upon him. This much gained, the patient's confidence in your powers are secured, and the field is ready for you to plant such suggestions as the conditions call for.[2]

Having your patient go to bed at the usual hour, you continually but forcibly suggest sleep. If you have succeeded in your tentative efforts you will be surprised to see how readily the patient will respond to your suggestions. Then I suggest how long she shall sleep, and that she will awaken refreshed and hungry. Be sure you tell her to sleep until a certain hour, for a subject under your perfect control will not always awaken unless the operator tells her to do so. One of my earlier experiences will illustrate. I was called to treat Mrs. M. who had been suffering from insomnia for several months. She responded to suggestions readily, and soon was in a state of hypnosis. About 9 o'clock the next morning there was a furious ringing of my door bell, an excited woman rushed in and said I had killed Mrs. M. Her family and friends had been trying for two hours to arouse her. Going immediately to the house I found family, physician and neighbors with their suggestions all there. Every method known to layman and doctor had been tried, but it was impossible to arouse Mrs. M. Going up to her I said firmly: "You must wake up now, Mrs. M.; wake up, wake up!" She opened her eyes and soon arose. It was her first good sleep for eight months, and the last time I ever forgot to suggest the duration of sleep to a patient.

The suggestive sleep by the Nancy method is harmless, and as far as my experience goes is a normal sleep produced by suggestion. The harm that comes from such a condition is due entirely to the purport of the suggestion made while in this receptive condition; evil suggestion can be given and will, to a certain extent, be accepted, as well as good.[3] [4] Hence we can see the importance of regulating the practice so that it can only be used by reputable and skillful men. Next to insomnia suggestion is most useful in

[2] See Dr. Schofield's Lectures, Victoria Institute, London, 1896. "Relation of Mind and Body, or the Powers of Unconscious Mind."

hysteric seizures. In those troublesome hysteric contractures of the extremities, suggestion during hypnosis seldom fails to give relief. Care must be taken, however, not to attempt to correct contractures of long standing, for as Charcot has said, when contracture has long existed, it becomes incurable. Hysteric amaurosis is readily relieved by suggestion during hypnosis. This is readily understood when we realize that hysteric amaurosis is not a systematic paralysis but a purely psychic amaurosis; a neutralization of the object perceived by the imagination. Dr. Hugh Patrick reported to this ASSOCIATION at its last meeting at Baltimore a case of hysteric blindness and pseudo-meningitis cured by suggestion.[5] The long and tedious list of the different phases, types and isomorphic forms of hysteria are all more or less amenable to treatment by suggestion. Cephalalgia, intellectual obnubliation, pseudo-hemi- and paraplegias are conditions that are benefited by suggestion.

It is not always that the hysteria itself can be cured, but the symptoms can be removed.[6,7] The treatment of dipsomania by suggestion is now being quite extensively used. At the present time we are not in the position to make any dogmatic statement regarding its certainty as a remedial agent. I have had excellent results with cases that have tried about every other known treatment. The fact that you can abolish the nervous insomnia, eliminate the anorexia, and stop the tremors and other concomitants following an alcoholic debauch, is sufficient evidence to cause one to treat these cases by suggestion. With these functional disturbances controlled I use continued suggestion regarding the use of alcohol while the patient is in a state of hypnosis. The result has been very gratifying. Bushnell, Surg. U. S. A., says: "I have never failed to hypnotize a patient who sought treatment for alcoholism."[8]

Dr. Am. De Jong reports very good results by this method of treatment during the last two years.[9] Crothers[10] advises its employment whenever possible, and says: "Clinical experience furnishes many facts which seem to prove that in certain cases its value is very marked, also promising from more exact studies greater results." Dill[11] gives a list of eight cases of dipsomnia treated successfully by suggestion. Green[12] gives a case of a man addicted to the abuse of alcohol, bromids and chloral cured by four hypnotizations. What I have said concerning the alcohol habit refers also to the drug habits.

Sexual perversion as a disease has been but little studied in this country; but experience has proven to me that it is quite prevalent here. Suggestion is the only method of treatment so far known that has any effect on these cases. I refer to the acquired condition, not the congenital; the latter in my hands has never been benefited. Masturbation in both sexes is generally well controlled by suggestion. It would be a work of surplusage to enter into details upon this subject when we have such classic works as those of Kraft-Ebing, Schrenck-Notzing, Moll, Ellis and many others.[14] Hypnotism will never supplant, in its present status, the existing anesthetics. Local and complete anesthesia can be produced by suggestion, but it is not available in an emergency case, unless the patient happens to be one in whom we have at prior times produced complete anesthesia by this method. In minor operations when the time for operation can be extended for a few days we can attempt to get our patient into that state of receptivity that will allow of producing a suggestive anesthesia. This can be seldom accomplished at the first attempt. When this anesthesia can be produced it is far superior to our present anesthetics; being devoid of any danger. Up to the present time we have had but one reported authentic case of death from suggestion, and that death was due to the purport of the suggestion, so forcibly made as to bring about the very result that was suggested, *i.e.*. death.[15] A case was reported last year from Paris as a death due to hypnotism. Prof. Bernheim gives the following explanation. "A man aged 37 years whom he had hypnotized to relieve the pain due to phlebitis of the leg, and whose death followed two hours afterward, was only an unfortunate coincident; as the postmortem showed death to be due to embolism of the pulmonary artery."[16] I have often operated in minor cases after putting the patient in a state of suggestive anesthesia. A large number of authentic cases have been reported. Wagner[17] gives twenty-one cases of minor surgical operations done under suggestive anesthesia, and three obstetric cases. Major operations have also been done under the same conditions. It is very useful in obstetric cases. Here to be of any value you must have frequently hypnotized your patient, and have become certain that she will respond to your suggestions at any time. The advantages of suggestion in parturition are the removal of consciousness of pain, regulation of position of limbs, body and attitude, and increase of uterine contraction of voluntary muscles. In dentistry, for the extraction of teeth, it is a most satisfactory method of painlessly operating.

What percentage of persons can be controlled by suggestion? Authorities differ. The result will depend upon the individual operator, as in any other branch of medicine and surgery. A conservative estimate would be about 25 per cent. I succeed in about 30 per cent. What class of patients is most susceptible to suggestion? Phthisical patients; children between the ages of 5 and 15 years of age; those of a neurotic temperament; last and most difficult is the hypochondriac and the melancholic. The insane, imbecile and idiots seldom, if ever, respond to suggestion in any form. A certain class of normal intellect can not be controlled by suggestion. To use a hibernianism, they will insist on keeping awake to see how you will put them to sleep. What are the requirements to be successful in using suggestion? The tact, judgment, diagnostic ability and confidence in one's self and all that makes the successful physician. Suggestive therapeutics is no "royal road" to success. It involves the same application, severe attention and experience that is necessary in all branches of medicine and surgery. Until you have had some experience you will not have

[3,4] See Tukey, Brit. Med. Jour. 1890, Vol. 12, 442-444. William Lee Howard, N. Y., Med. Jour., March 9, 1895, 298-300.
[5] Jour. Am. Med. Asso., Feb. 8, 1896.
[6] Claus. A. et F. Jacobs. Un cas d'hystérie chez une fillette de huit ans; guérison par suggestion. Ann. Soc. de Méd. d' Anvers. 1896.
[7] Kochs; Phénomènes hypnotiques chez une hystérique. Allgem. Zeitsch. f. Psychiatrie, t. l. fasc. 5, 1894.
[8] Med. News, Phila., 1894, xlv, 337-343.
[9] Inebriety and its Treatment by Hypnotism.
[10] Jour. Am. Med. Asso., Nov. 30, 1895.
[11] Dipsomania and Hypnotism, by John Gordon Dill, M.A., M.D., Quart. Jour., Inebriety, October, 1895.
[12] C. Theo. Green, M.R.C.S., L.R.C.P., Quart. Jour., Inebriety, October, 1895.
[14] Psychopathia Sexualis von Kraft-Ebing; Suggestive Therapeutics in Psychopathia Sexualis, von Schrenck-Notzing. Sexual Perversion, Albert Moll; Sexual Perversion, William Lee Howard, Alienist and Neurologist, January, 1896.
A Case of Heredity. W. L. Howard, Md. Med. Jour., April 25, 1896.
[15] See Author's paper in Jour. Am. Med. Asso., Nov. 30, 1895.
[16] Revue Médicale de l'Est., Feb. 1, 1895.
[17] N. Y. Med. Jour., xlix.

that full confidence that is necessary to impress your patient. There is no such thing as "will power," "animal magnetism," or any other so-called occult force employed. Get your patient in a state of mental receptivity by having him look at some small bright object distant about six inches from the pupils and a little above them. When the eyelids begin to close, or a fibrillary motion commences, close them gently, and in a low but emphatic tone of voice suggest sleep. Once in this state the therapeutic suggestion should be made. In a large number of cases it is not necessary to produce complete hypnosis to get satisfactory therapeutic results. If the patient is only in a state of lucid lethargy he will often accept a suggestion with good results. A new idea of the explanation of the phenomena of hypnotism has just appeared.[18] This is no place for psychologic discussion or polemics, but as this idea has only been put before the profession the last few days I will call your attention to it. Dr. Henry Stark of Boston says: "Hypnotism is a pathologic process depending for its origin on contagium, probably specific in character, although unrecognizable by any of the five senses."

Suggestion as a therapeutic method of treatment is only an adjuvant, often a powerful one, to go hand in hand with other rational means of hygienic and medicinal treatment, and is not to be understood as by any means being a certain cure for all ills and complaints that man is heir to. It is not a catholicon, a philosopher's stone, as many enthusiasts would have us believe.

Psycho-physiology[19] has placed suggestion on a sound scientific basis, and those who step from this basis and make claims that have no psychologic foundation, are those seized with the vertigo of the supernatural and condescend to serve as vouchers for the most absurd aberrations.

THE ANTITOXIN OF TETANUS.

Read in the Section on Materia Medica, Pharmacy and Therapeutics at the Forty-seventh Annual Meeting of the American Medical Association, at Atlanta, Ga., May 5-8, 1896.

BY SAMUEL S. KNEASS, M.D.

ASSOCIATE IN THE WILLIAM PEPPER CLINICAL LABORATORY, UNIVERSITY OF PENNSYLVANIA.

Among the many principles on which are based our modern theories of the etiology and therapeutics of disease is that of the vaccinating or immunizing power of attenuated cultures of specific microörganisms. Although this principle is forecast by Jenner's discovery of the vaccine against variola, it is to the great Frenchman, Pasteur, that should be ascribed its first scientific development.

In 1880 this investigator showed that an attenuated culture of the microbe of chicken cholera, injected into animals, would produce a mild attack of the septicemia, and would leave them immune against a second attack. This was the first experimental fact to which numerous laboratory workers have been adding during the last fifteen years. Disease after disease has been added to the list, anthrax, hog cholera, malignant edema, hydrophobia, diphtheria, the infections due to the staphylococcus, the streptococcus and the pneumococcus, typhoid fever and tetanus.

It is not the purpose of this account to go into the history of the subject or the various theories of immunity except so far as they bear on the subject in hand, the antitoxin of tetanus and its use in the treatment of tetanus in the human being.

The bacillus of tetanus, first discovered by Nicolaier in 1884 in tetanic animals, and afterward by Rosenbach in 1885, in the local lesion in man, was finally isolated and studied by the Japanese, Kitasato. Since then, these results have been approved by so many investigators, that we say definitely that it is proved that Nicolaier's bacillus is the specific cause of tetanus in all its clinical forms, traumatic, idiopathic, rheumatic, puerperal and of the new-born. It is the type of the specific intoxication. The bacillus growing only at the initial lesion there elaborates its toxin. An important point to remember is the extreme toxicity of the products of secretion of this bacillus. A 1-1,000 c.c. is sufficient, when injected subcutaneously, to kill an adult guinea pig. Evaporated to dryness this is represented by 0.000,025 (25-1,000,000) gm. A mouse succumbs to a dose of one-hundredth this quantity, 25-100,000,000 gm.

Brieger had found and isolated a ptomaine from tissues of a fatal case of tetanus, which he named tetanin. This was obtained also from cultures of the bacillus by Kitasato and Weyl. This substance kills animals with the characteristic symptoms of tetanus. But this is not the substance to which is due the intense intoxication of tetanus, and Brieger himself obtained a toxalbumin of much greater toxicity. This toxalbumin, the chemic relations of which we do not know, is probably only an impure form of the specific toxin; a mixture of the precipitated albumins and the toxin.

Brieger and Cohn (1893) were able to make a step in advance in the separation of a purer toxin. They used an intensely virulent veal-bouillon culture of tetanus bacillus. This they supersaturated with ammonium sulphate, and removing the supernatant precipitate, dried it on porcelain in a vacuum. Of this, 1 gm. was obtained for 1,000 c.c. of bouillon; and 1-10,000,000 gm. was sufficient to kill a 15 gm. mouse. But it was still impure. It was dissolved in water and was treated with a small amount of ammonia and basic acetate of lead to precipitate the albumins; dialyzed from twelve to forty-eight hours in running water to get rid of the peptones, salts, etc., and evaporated in vacuo at a temperature of 20 to 22 degrees C. This gave slightly yellow, transparent scales, odorless, with aromatic taste and soluble in water. It gave no reaction to Millon's fluid, nor responded to the xanthoproteic or biuret test. A slight violet color resulted with cupric sulphate and sodium hydrate; and no precipitation with the albumin precipitants, except ammonium sulphate. There was no phosphorus, and but a trace of sulphur. It is not, therefore, to be classed among the albumins. Of this substance but 1-20,000,000 gm. is sufficient to kill a mouse; or, assuming the action of the toxin to be similar in degree upon the human being, but about $\frac{1}{4}$ mg. would be fatal to a man weighing 70 kg.

Brieger and Boer have lately been able, by another method to procure a purer and more concentrated form of toxin, and also of antitoxin. Instead of alcohol or sulphate of ammonium they used salts of zinc, the sulphate or preferrably the chlorid. The filtered tetanus bouillon or the serum was diluted with five volumes of water and to this was added two volumes of a 1 per cent. solution of the salt. After

[18] Psychic Infection: Remarks upon the Probability of a Mental Contagium, N. Y. Med. Record, April 18, 1896.

[19] Crocq fils: L'hypnotisme Scientifique. Rapport à M. le ministre de l'Interieur, a de l'instruction Publique. Introduction de M. le Prof. Pitres, 1896.

standing a short time a precipitate formed. The antitoxin precipitate is dissolved in slightly alkalin water, a stream of carbonic acid passed through it. With the sulphate, the antitoxin is again precipitated; with the chlorid, it remains in the filtrate, free from the zinc salt. Any traces of the metal are further washed out by treatment with ammonium sulphid. They obtained from 10 c.c. of serum about 0.1 gm. of an antitoxic powder easily soluble in water. The toxin could not be freed from the metal. One liter of bouillon gave 3 gm. of the zinc combination, which contained about 0.3 gm. of organic matter and represented the full strength of the original filtered culture.

Wolinsky made his cultures in a non-albuminous medium composed of water, glycerin, sodium chlorid, magnesium sulphate, potassium phosphate, ammonium lactate and sodium asparaginate. The filtered culture in this medium gives a faint Millon's and xanthoproteic reaction, a slight cloudiness with phosphor wolframic acid, and no immediate precipitate with acetic acid and potassium ferrocyanid; only after six to seven minutes is there a greenish cloudiness formed. He recognized that he had but a very impure principle, but claims that it "appears to belong to the proteid bodies and that it has great similarity to the ferments."

This fact that the toxin is essentially a diastase or zymose was already put forward by Tizzoni and Catanni, a view afterward adopted by Vaillard and Vincent, E. Roux, Faber and others finally demonstrated by Courmont and Doyon. These authors called attention to the important fact that after the injection of the tetanus toxin, there is always a certain period of delay in the development of symptoms—a distinct period of incubation. They show that this is uninfluenced by and bears no relation to the amount of toxin injected. Two hundred c.c. were injected into a dog without the immediate appearance of tetanus, which only developed on the third day. An injection of 4 c.c. gave the same period of incubation. The blood and tissue juice of this dog, however, produced in an injected animal an almost immediate tetanic intoxication.

In an extensive comparison of the chemic and other relations of the several known ferments and toxins, Fermi and Celli combat this idea and try to show that the toxin of tetanus is not to be ranked among the ferments. In reading their work, however, one is not sufficiently convinced of the error, considering the similarity of many of the chemic reactions, which even they show; considering the fact that the toxin in its purity is as yet not isolated, but may still be intimately mixed with some albuminoid body, and considering the clinical facts put forward by Courmont and Doyon, one may, I think, adopt the view that the toxin of tetanus is, at least, akin to the ferments (the zymoses) and that it is by its action on the blood and tissue juices of the organism that the true active intoxicant is produced. At any rate it is justified as a working hypothesis.

Behring and Kitasato in 1890 first report the cure of tetanus and resulting immunity of animals treated with the serum artificially immunized animals. Rabbits rendered immune by their method, bore without fatal result the injection of a virulent culture of the tetanus bacillus (10 c.c.), the minimal fatal dose of which for a non-treated animal was 0.5 c.c. They showed that there was in the blood serum of artificially immune animals a substance that in some way antagonized the action of the bacillus or its toxin, an antitoxin. To quote: "A mouse has been rendered tetanic, it has contracture of its extremities, and seems about to die; it is sufficient to make this injection for a cure to follow so surely and rapidly that a few days after the animal is perfectly well." Their conclusions, however, as to the therapeutic effects were not realized.

Later Behring published his method. At first, following the inoculation, injections of the trichlorid of iodin were made. But it was better to previously add this attenuating substance directly to the culture before injecting.

Five cubic centimeters of a virulent culture containing 0.25 per cent. of the trichlorid were injected into a rabbit. After a lapse of three or four days, another injection of 5 c.c. containing 0.2 per cent. of the iodin. Another pause and another injection containing less iodin, and so on for some six weeks, at the end of which time a degree of immunity was reached equal to 1 in 400 or, according to Ehrlich, to 10 immunity units. That is, of the serum injected into a 20 gm. mouse 0.05 c.c. or 1-400 of the body weight would protect it against the minimal fatal dose of the toxin. Horses were immunized in the same way by using a beginning dose of 10 c.c. of carbolized cultures with 0.25 per cent. of iodin trichlorid added and very gradually increasing the amount of toxin and decreasing the amount of the iodin salt. The degree of immunity reached was 1 to 5,000.

This, however, is only when the injection of the serum is made shortly after that of the toxin. If it is done before, the proportion is larger; instead of 1 to 5,000, it would be 1 to 25,000. Again, it refers to the minimal fatal dose. If stronger doses of the toxin are given, say one hundred times the minimum, the serum must be used in larger amounts, one thousand times as much as before or 1-1,000 of the body weight. This is of interest in the treatment of human tetanus, in which the amount of toxin elaborated, possibly often far exceeds the smallest fatal dose.

Tizzoni and Catanni, soon after the first work of Behring and Kitasato, were able to immunize a dog, a comparatively resistant animal, by injections of small amounts of tetanus toxin and slowly increasing the dose. Unfortunately they were unable to agree with Behring and Kitasato as to the therapeutic success of the antitoxic blood serum. "The development," they say, "of the tetanic symptoms is in no wise hindered when the serum is not injected before their appearance." This result, obtained upon experiment animals, is one that they would do well to apply in the cases of tetanus, in man, which were treated with their antitoxin. Kitasato himself later agreed that the greatest efficacy was observed when the injections of antitoxic serum were made before or immediately after that of the toxin.

Brieger, Kitasato and Wasserman made use of a a bouillon made of thymus gland in which to produce an attenuation of the virulence. Successful in preventing tetanus in only 40 per cent. of the animals experimented on, they show that this thymus extract has a distinct toxin-destroying action.

Another method of the attenuation is by means of heat. Vaillard uses filtered cultures that have been heated to 60, 55 degrees C. and so on, gradually dimin-

ishing the temperature and increasing the amounts. Finally Vaillard and Roux make use of a solution of metallic iodin, Gram's solution, commencing with doses in the proportion of one of the iodin to three of the filtered culture and by gradually increasing the ratio were able to completely immunize rabbits. A detailed account of their method is as follows: For about seven weeks a mixture of equal parts of toxin and Gram's solution was injected into a horse in doses increasing from 0.5 c.c. to 10 c.c. Then for a while 4 c.c. increasing to 10 c.c. of toxin and Gram's solution in the proportion of 2 to 1. An injection of 1 c.c. of pure toxin was now given and repeated in increasing amounts until at the end of three weeks the animal could stand 22 c.c. After a rest of a few days 4 c.c. of toxin was given directly by the jugular vein. Five weeks after 70 c.c. could be injected intravenously without ill effects. At the end of a month's interval the serum had an antitoxic power of 1 to 50,000. Treatment was resumed and pushed until 90 c.c. of pure toxin was being injected into the jugular vein. After a pause in the treatment for two weeks, or about seven months from the beginning, the serum was shown to be protective to the extent of 1 to 1,000,000.

How does this toxin act? Many experimental facts have been brought forward to elucidate this point. Roux, and also Buchner, show that a mixture of the toxin and antitoxin retains the properties of the two ingredients; that a mixture neutral and without effect upon a mouse is still toxic for the more sensitive guinea pig. Animals treated with certain microbes, such as prodigiosus, cholera, streptococcus, etc., lose some of their resisting power and become more sensitive to a mixture, which in their normal state would have no effect. This serum then, according to them, is not, strictly speaking, an antitoxin. It does not directly or in vitro destroy the toxin. But it exercises, as Roux puts it, a stimulative action upon the cells of the organism, which augments their energy and they become able to resist the poison.

Behring has shown that an animal may become "over-sensitive," a condition occurring in the process of immunization in which the animals seeming at first immune, succumb to the tetanus toxin, although the blood serum is in a high degree antitoxic. The blood of such an "over-sensitive" horse may, in doses of 4 c.c., immunize another animal.

On the other hand, in a highly immunized sheep the antitoxin may after a time disappear from the blood, without any diminution of the immunity. It is probable that tissue immunity and the formation of antitoxin are not directly related.

On the other side, Fodoroff found that with large doses of the toxin, as sixty times the minimal fatal dose, a certain proportion of the serum necessary to prevent the development of tetanus (3 to 1 in the case of white mice), when previously mixed, had no effect when injected at different points, even when done simultaneously. Animals were injected with antitoxic serum, a dose of 0.02 mg. of which was sufficient to immunize against the minimal fatal dose of toxin in amounts varying from 50 to 200 mg., given in three to five injections. These were found to be resistant to doses of 3, 6 and even 8 mg. of toxin, the minimal lethal dose of which was 0.001 mg., but invariably succumbed to injections of 12 mg., even when given immediately after the immunizing serum. White mice which had received three daily injections of 50 mg. of dried serum, were given, some a mixture of 50 mg. of serum and 12 mg. of dried filtered tetanus toxin, and others the same amounts of the same substance, but injected at different points. The former animals were unaffected, the latter all succumbed to tetanus. From these experiments Fodoroff assumes that the antitoxin has a toxin-destroying action.

The hypothesis upheld by Courmont and Doyon seems to lend itself more than others to the explanation of these often contradictory facts. The symptoms are produced not directly by bacterial secretion, but by a substance which is the result of the action of a bacterial enzyme. Once this true toxin is formed in the organism, it is doubtful how much it can be affected by the antitoxin, at least directly. It is upon the ferment itself, however, that the antitoxin acts, inhibiting or modifying its action, either directly or by stimulating a cellular resistance.

But these experiments have all been made with the so-called toxin of tetanus. It is the study of the effect of the serum upon animals inoculated with the bacilli themselves, that cause us further to limit its action. The work of Beck is here of interest. He used instead of filtered cultures, small splinters of wood inoculated with tetanus bacilli. A splinter 0.5 cm. long and 2 mm. thick killed a guinea pig of 400 gm. in three to four days. In a series of some twenty-six guinea pigs so inoculated, twelve recovered from more or less severe tetanic symptoms, six died from pneumonia, after an improvement of the tetanus. A series of five pigs which twenty-four hours before the splinter inoculation, were injected with 5 c.c. of a serum of an immunizing power of 1 to 4,000,000, all recovered from mild attacks. Reinoculated some three weeks after, they all died in about four days, showing that the immunity thus produced is of short duration.

Of thirty-eight pigs injected with 5 c.c. of serum at periods varying from one hour before the inoculation to twenty hours after, fourteen died of tetanus; all but one that were injected sixteen hours and over after the inoculation succumbed. The deductions we may draw from his work are that after a given period after the tetanus toxin has once developed in the organism the serum, in animals at least, is powerless.

And now the subject of human tetanus. Approaching it from the laboratory one can not but feel somewhat skeptical in regard to what is claimed for the serum by its most ardent adherents. The difference, however, of the pathologic reactions of the human and other animal organisms show us that we must look at this side of the matter from the clinic standpoint only. In general, do statistics show any reduction in the mortality in tetanus treated with antitoxin, or does such treatment seem to have any effect upon the symptoms in individual cases?

The mortality from tetanus is difficult to determine. Poucet reports 713 cases with a mortality of 90.6 per cent.; in the Civil War it was 89.3 per cent.; Richter gives 88 per cent.; Somain, 56 per cent.; Roux and Vaillard 50 per cent.; Knecht 45 per cent.; Albertoni 24 per cent.; Behring 20 per cent.; Verneuil claims 50 per cent. recoveries with large doses of chloral. In some thirty-five cases that I have collected from the current literature, the mortality is about 40 per cent. The higher percentages have been taken generally from war records, and are therefore too high; and, on the other hand, Albertoni's statistics seem too

low. It is probable the figures adopted by Roux and Vaillard are nearly correct, say from 45 to 50 per cent.; 47 per cent. is the average of the various percentages given. I have collected from the recent literature sixty-eight cases that were treated with the various antitoxins. Among these there have been thirty deaths, giving a mortality of nearly 47 per cent. But we can judge better if we examine more in detail.

Richter and Rose give the mortality in tetanus, in which the symptoms have appeared within five days after the inoculation, as 96 per cent.; the Surgical History of the War says that 85 per cent. died in the first week; of twenty cases with a mortality of 45 per cent., the death rate of those in which the period of incubation was from one to five days was 100 per cent.; from six to eight days 80 per cent.; from nine days or more 0 per cent.

We may safely say that cases developing during the first week rarely, if ever, recover, and cases, the incubation of which is over two weeks, rarely die. Of the sixty-eight cases here collected, which were treated with the antitoxic serum, but sixty-one have been recorded with sufficient detail from which to draw any conclusions. The mortality of the whole number is 41 per cent. Of the sixty-one cases thirty-six recovered, giving also a mortality of 41 per cent. A comparison of this with the probable percentage of deaths in cases treated by other means, 50 to 45 per cent., leads us to no verdict but that of not proven.

The following condensed table shows mortality of cases arranged according to the period of incubation:

Period of Incubation.	Deaths.	Recoveries.	Percentage of Mortality.
1 to 5 days	7	1 (?)	87.5 (?)
6 to 14 days	16	25	38
15 days and over . .	2 (?)	10	16.66 (?)

The cases classed according to their incubation periods show a like similarity. Of eight in which this was from one to five days, only one recovered, and this (32) was regarded by the physician as of somewhat doubtful character. When the disease developed in from six to fourteen days after the infection there is a much lower death rate. Of forty-one cases, twenty-five recovered and sixteen died. And with an incubation period of fifteen days, two of twelve cases succumbed. These two were cases in which the period of incubation is extremely doubtful. In one the first appearance of symptoms took place fifteen days after the extraction of a number of teeth. In the other the patient, who was a stableman, had gone on attending to his duties in the stable for three weeks after his injury. In all probability the inoculation in these cases took place at a much shorter time from the development of the tetanus. If this is so, the mortality of this period would be nil.

The only conclusion it seems to me is that those cases in which the symptoms appear before the sixth day die, in spite of any antitoxic treatment, and that those in which the development of the disease is delayed beyond the second week would recover without any such treatment. Possibly the number of cases as yet reported is too small to warrant this general statement, but the results are not encouraging.

There seems to be no relation in the severity of the symptoms to the prognosis. The temperature which is generally normal or subnormal, rises more often in the fatal cases (nineteen times in twenty-seven) but this is no criterion. The shortness of the incubation period and the rapidity of the onset are two important

TABLE SHOWING THE DAYS AFTER THE APPEARANCE OF SYMPTOMS ON WHICH THE INJECTIONS OF SERUM WAS BEGUN.

Date of Disease when Injections began.	Period of Incubation.					
	1 to 5		5 to 14		15 and over	
	Died.	Rec.	Died.	Rec.	Died.	Rec.
0	1		2			
1			4	3		
2	1		5	2	1	
3			1	2	1	3
4	2		2	4		
5		1		2		3
6			1	3		
7			1	2		
8	3					
9				1		
10				1		2
11				1		
12				1		
13						1
14				2		
15 and over				1		
Total	7	1	16	25	2	10

factors. When we remember the experimental proof that the sooner after inoculation the antitoxic serum is injected, the more likelihood there is of some beneficial result, we should expect, if there be any such effect, to find it among those cases in which the treatment was earliest begun. A glance at the table will show that this is not the case. Of the sixteen fatal cases, whose period of incubation ranged from six to fourteen days, fourteen had the treatment begun during the first four days, and of the twenty-five in which the serum was injected before the fifth day, fourteen were fatal. Among the sixty-eight cases but twenty-two are reported as causing an immediate improvement in the character of the symptoms, and in many of these the injections were begun so late in the course of the disease that one hesitates to ascribe this improvement to anything but a coincidence. This agrees with many of the authorities. Berger says that "without rejecting the injections of antitoxic serum in the treatment of tetanus, we can have but the most limited confidence in its curative efficacy." Roux has said that he has never seen the serum have the least effect upon the course of the disease.

Then the early treatment after the appearance of symptoms has no appreciable effect. The symptoms are caused by the action of tetanus toxin already elaborated and producing its intoxicant effect upon the cells of the organisms. It is then too late to hope for either any antitoxic or any immunizing action. Could we but make the injection soon after the time of inoculation we might expect some result, but unfortunately this is impossible.

Another thing we notice in examining the several cases, and that is the small amounts given. Beck shows that with the Behring's serum of 1-4,000,000 immunizing power which he used in his experiment, 1-100 of the body weight must be injected. This for a man of 60 kg. would be at least 600 c.c. of serum. Much of the serum used in human tetanus is much less powerful than this.

Tizzoni and Cattani claim an immunizing power of 1 to 100,000,000 for theirs. However, Hübener has shown it to be much less, at least as furnished by Merck, and Behring and others say it is completely worthless. Roux has recently prepared a serum with an immunizing power of 1 to 1,000,000,000.

There is one department in which the serum has been of value, and that is in veterinary medicine. Dr. Nocard of Altorf gives some very favorable

reports. These come from veterinarians and others throughout France, who have used the serum immediately after operations on animals. Among 375 animals (327 horses, 47 lambs and 1 ox) the injections were successful and not a case of tetanus occurred. During the same time fifty-five cases of tetanus were observed among non-inoculated animals. Two injections of the serum are given, of 20 c.c. and 10 c.c. with a fifteen days interval between.

Picard records that, during 1891-94, fifteen horses succumbed; during 1895, in which year he used the antitoxic serum, none. Coret lost, previous to 1895, from thirty to forty horses yearly by tetanus; in 1895 none succumbed. Before the use of antitoxin he lost an average of fifteen horses each semester; in 1895, fifty-four suffered from wounds both accidental and operatory, and none died. During the same semester, among non-treated animals seven died from tetanus. Therefore eight horses were saved by the use of the antitoxic serum.

Following traumatic lesions in animals, tetanus is not such an uncommon accident as it is in man, and we may expect, as seen by the above, some definite results in its use in such cases, the more especially as it is given as soon as possible after the injury.

But in the human race we can not say that it has had that success which we first hoped for it. We should not yet condemn it, but await the results of larger doses and more powerful serum.

ON THE TOXIC ACTION OF DISSOLVED SALTS AND THEIR ELECTROLYTIC DISSOCIATION.

Read in the Section on Materia Medica, Pharmacy and Therapeutics at the Forty-seventh Annual Meeting of the American Medical Association at Atlanta, Georgia, May 5-8, 1896.

BY LOUIS KAHLENBERG, PH.D., AND RODNEY H. TRUE, PH.D.

LABORATORIES OF THE SCHOOL OF PHARMACY, UNIVERSITY OF WISCONSIN.

During the last decade, work in physics and chemistry, especially in physical chemistry, has been characterized by a thorough and systematic study of solutions from both the theoretic and the experimental point of view. As a result of the activity along this line, our knowledge of the conditions of dissolved substances contained in solution has been greatly extended. Thus Van't Hoff of Amsterdam, basing his argument upon the osmotic experiments of Pfeffer of Leipzig, extended the principle of Avogadro to dilute solutions showing that equal volumes of dilute solutions having the same osmotic pressure and the same temperature contain an equal number of molecules. When Avogadro put forth his hypothesis that equal volumes of all gases under the same conditions of temperature and pressure contain an equal number of molecules, facts were found that apparently were strongly adverse to this view. Thus, when the vapor density of the chlorid of ammonium was determined, it was found to be only a little more than half as great as was required by the principle of Avogadro. This fact caused at first much opposition to Avogadro's views, but this opposition was finally cleared away when it was shown that, in the vapor of chlorid of ammonium, we have not simply the molecules of that salt, but also hydrochloric acid and ammonia molecules, the products into which the chlorid of ammonium in the vapor form is to a large degree broken up or dissociated.

The theory of Van't Hoff has had a similar difficulty to contend with. As he himself showed, his theory did not represent the facts when working with aqueous solutions of salts, acids and bases, in short, with solutions that are conductors of electricity. In his mathematical formulæ, Van't Hoff introduced a factor to overcome the departure from his theory presented by such solutions. Soon, however, Arrhenius from the interrelation between the lowering of the freezing point of the solutions and their electrical conductivity, came to the conclusion that in aqueous solutions, salts, acids and bases are to a greater or less extent broken up or dissociated into part-molecules or ions (a term originated by Faraday). These ions are charged with electricity each gram-equivalent bearing 96,540 coulombs. This latter figure is derived from experiments on electrolysis. It has well been termed the constant of Faraday's law.

Arrhenius published his theory of electrolytic dissociation in 1887 and all investigations made on salt solutions, including those of acids and bases, have confirmed this theory. In addition to the lowering of the freezing point and the electric conductivity, the elevation of the boiling point, the specific volume, as well as the optical and thermal properties, all strongly support the views of Arrhenius. This theory has given a clear insight into the processes going on in voltaic combinations and makes it possible to calculate with accuracy in advance what will be the electromotive force of a voltaic combination. In the hands of Ostwald, it has placed analytic chemistry on a firm scientific basis. In short, all the physical and chemical properties of aqueous solutions of electrolytes are well explained by the assumption that in these solutions, the dissolved substances are split up into part-molecules or ions, and that the various properties of the solutions are due to the properties of the ions. The more dilute the solution, the more is the dissolved substance dissociated and at infinite dilution, this dissociation is complete. In the case of many salts, however, namely those of the stronger bases, the dissociation goes on very rapidly with the increasing dilution so that in case an equivalent in grams is dissolved in about 1,000 liters of water the dissociation is practically complete.

Viewing these things in the light of the theory of Arrhenius we have, for example, in a solution of sodium chlorid, sodium ions and chlorin ions beside a certain amount of dissociated sodium chlorid molecules. Experiments on the electrical conductivity show that in this case, dissociation is practically complete when one gram-molecule (*i. e.*, 23+35.5=58.5 grams) of the the salt is dissolved in 1,000 liters of water. We have at this dilution not NaCl molecules in solution but Na ions and Cl ions; we denominate them in the usual way, +Na and —Cl.

The question has often been raised: In what way do Na and Cl in the ionized state differ from ordinary sodium in the metallic state and ordinary chlorin, respectively? The difference lies in the energy possessed. Ten grams of sodium ions, for instance, contain less energy than do ten grams of metallic sodium. Supply the energy to the ions as in the case of electrolytes and we convert the ions to the metallic sodium. Sodium ions and metallic sodium are, therefore, not the same. The lack of understanding on this point caused a tardy acceptance of the dissociation theory at first, notably on the part of English chemists.

Hydrochloric acid dissociates into +H ions and −Cl ions; the H ions bearing the positive charge and the Cl ions bearing the negative charge. There exists in the solution necessarily as many positive ions as negative ions in order that electric neutrality may be preserved. A dilute solution of sodium chlorid and one of hydrochloric acid have in common Cl ions, their difference is due to the fact that the positive ion of the former is Na, and of the latter, H. To this difference is to be ascribed all the differences seen in the properties of the two substances. In general, solutions of all acids contain hydrogen ions, solutions of all chlorids contain chlorin ions, those of the sulphates contain SO_4 ions, those of the nitrates contain NO_3 ions. Salts of copper contain copper ions, salts of lead contain lead ions. In general, if we let BA represent the formula of a salt, B representing the basic radical and A the acid radical, then in dilute aqueous solutions, this compound is to a greater or less extent dissociated into the ions B and A and all the physical and chemic properties that such a solution possesses are due to the properties of the ions in the solution. If it is true that all the physical and chemic properties of aqueous solutions of salts, acids and bases are due to the properties of the ions, plus those of the undissociated substances they contain, does it not seem probable that the physiologic properties of such solutions are also due to these? This thought, simple as it is, has to our knowledge never before been expressed.

Many investigations have been made on the physiologic action of aqueous solutions of salts on bacteria and higher forms of plant life as well as on animals. The strength of the solutions with which these experiments were made has always been expressed in per cent. and it is probably for this reason that general considerations have entirely escaped observation. If a very dilute solution of sodium chlorid differs from a dilute solution of hydrochloric acid only in the fact that the former contains sodium ions and the latter hydrogen ions, then the poisonous action of the latter is plainly due to the hydrogen ions present. In like manner comparing a very dilute solution of sodium nitrate with a similar solution of nitric acid, the poisonous nature of the latter would be due to the hydrogen ions present. In general, if the solution is sufficiently dilute so that the acid dissolved is practically completely dissociated and the acid radical is of such a nature that in this concentration its ions have practically no poisonous action, the toxic value of the acid solution is due to the hydrogen ions present.

Now strong acids are highly dissociated in watery solutions, thus rendering them relatively rich in hydrogen ions. Weaker acids are less dissociated since their solutions contain less hydrogen ions. It must always be borne in mind that the salt remaining undissociated is present in the solution as well as the ions. That these undissociated remainders and the ions of the acid radical also exert an effect, is not to be denied but in many cases, such as that of the Cl ions in hydrochloric acid, the action is practically nil at the strength at which hydrochloric acid is effective, since a solution of common salt containing as many Cl ions as the HCl solution in question, is ineffective. The same reasoning may be applied to nitrate of sodium and nitric acid; also to sodium hydroxid and common salt. In the latter case, the solutions differ from each other in that the former contains OH ions, whereas the latter contains Cl ions. All solutions of the bases (lyes) contain OH ions and their toxic action is due to their OH ions alone provided the metal or corresponding radical, the cathion, is itself harmless at the particular concentration used. We see then that H ions and OH ions have toxic properties. That it is the ionized condition that brings this about, is shown by the fact that in the case of water where we have these constituents in practically an undissociated state there is no toxic action.

The poisonous property of a very dilute solution is, then due to the ions it contains, and if at the particular dilution in hand only one physiologically active ion is present, the effectiveness of the solution is to be attributed to that one ion. Solutions of hydrochloric, nitric and sulphuric acids are nearly completely dissociated when an equivalent in grams is dissolved in 1,000 liters of water. Hence such, or more dilute, solutions of these acids, when chemically equivalent quantities are dissolved, ought to have the same toxic effects, the Cl, NO_3 and SO_4 ions in such dilution being harmless. That these radicals are harmless is shown by the effect that like concentrations of the sodium salts of these acids are harmless.

We have tested this point experimentally for the higher plants by ascertaining the strength of solution in which the roots of the ordinary field lupine (Lupinus albus) will just live. We have found that the limit of these acids is reached in a solution containing one equivalent in grams in 6,400 liters of water. We may say, then, that one gram of hydrogen ions distributed through 6,400 liters of water will give a solution in which roots of the lupine will just grow. It is entirely immaterial at this dilution whether we take hydrochloric, nitric or sulphuric acids, the toxic action of the solutions is the same provided the solutions contain the same amount of hydrogen ions. The molecular weight in grams, or simply gram-molecule, of acid sulphate of potassium in 6,400 liters would contain as much ionized hydrogen as a gram molecule of hydrochloric acid and should therefore have the same effect toxically. This was confirmed by experiment.

The action of about forty acids was investigated and the results point to the fact that in many of them the poisonous effect is due in great part to the hydrogen present as ions. In some of these acids, dissociation is not complete at the concentration-limit found; in other cases, the harmful influence of the anion can not be neglected.

The following table shows in the first column the names of acids investigated; in the second column is the concentration just allowing growth, expressed in fractions of a gram-equivalent of the acid per liter of water.

TABLE I.

Acids.	Concentration-limit. Equivalent.	Acids.	Concentration-limit. Equivalent.
Hydrochloric,	1-6400	Malonic,	1-3200
Nitric,	1-6400	Potas. acid oxalate,	1-3200
Hydrobromic,	1-6400	Ortho-nitro-benzoic,	1-6400
Acid potas. sulphate,	1-6400	Meta-nitro-benzoic,	1-12800
Sulphuric,	1-6400	Para-nitro-benzoic,	1-12800
Phosphoric,	1-6400	Mono-chlor-acetic,	1-6400
Chromic,	1-12800	Di-chlor-acetic,	1-6400
Hydrocyanic,	1-12800	Tri-chlor-acetic,	1-12800
Formic,	1-6400	Mono-brom-acetic,	1-12800
Acetic,	1-1600	Cinnamic,	1-12800
Propionic,	1-3200	Meta-oxy-benzoic,	1-3200
Butyric,	1-3200	Para-oxy-benzoic,	1-1600
Valeric,	1-3200	Hippuric,	1-6400
Benzoic,	1-6400	Gallic,	1-6400

Salicylic,	1–6400	Protocatechuic,	1–3200
Oxalic,	1–3200	Citric,	1–3200
Succinic,	1–1600	Aspartic,	1–6400
Tartaric,	1–6400	Glycolic,	1–6400
Fumaric,	1–6400	Malic,	1–3200
Maleic,	1–3200	Lactic.	1–3200

A glance at the results shows that the concentrations at which the plants survive vary from 1–1600 gram-equivalent to 1–12800 gram-equivalent.

For mineral acids and other strong acids in which at the dilution under consideration the anion exerts practically no influence, the concentration at which the lupines survive is determined solely by the hydrogen ions present. The concentration found is 1–6400 gram-equivalent per liter. When the lupines live in a greater concentration than this, dissociation, even in the great dilution used, is not complete. In the cases where the limit lies at 1–12800 gram-equivalents per liter, the influence of anion and in some cases, HCn, for example, the dissociated remainder of the acid, has to be taken into account.

Since this is to be regarded as a preliminary report, a discussion of the action of the individual acids is not given. This may be sought in the complete report which is to appear later.

Of especial interest is the conduct of boric acid. This is a very weak acid and is but slightly dissociated even in dilute solutions and lupine roots survive in a concentration of 1–25 gram-equivalent per liter. When mannite, which in itself is not harmful to the plant, is added to the boric acid, boro-mannitic acid is formed which is stronger than the original acid. Its solutions contain more hydrogen ions and hence should be more deadly to the plant. Experiment corroborates this since the limit-concentration of the boro-mannitic acid was 1–100 gram equivalent of the boric acid to the liter.

The following table shows a list of the salt solutions investigated. The first column enumerates the salts, the second column is the concentration expressed in gram-equivalents per liter at which the plants just survived. In the case of $FeCl_3$, the concentration is otherwise indicated.

TABLE II.

Salt.	Concentration-limit.
$AgNO_3$	1–204600 equivalent.
Ag_2SO_4	1–204600 "
$HgCl_2$	1–12800 "
$HgCn_2$	1–51200 "
KCn	1–6400 "
$CuCl_2$	1–25600 "
$CuSo_4$	1–25600 "
$Cu(C_2H_3O_2)$	1–25600 "
$NiSO_4$	1–25600 "
$FeSO_4$	1–12800 "
$FeCl_3$	Fe. 0.0025 gram per 1. Cl. 0.0047 " "
$CoSO_4$	1–12800 "
$Co(NO_3)_2$	1–12800 "
$Cd(NO_3)_2$	1–102400 "

From the above we see that the lupines just survive in a solution of silver sulphate containing 1–204600 gram-equivalent per liter. Since the same is true of silver nitrate, it follows that the silver in these solutions is the active constituent. Moreover, it is silver in the ionized state. To show this, silver nitrate was treated with potassium cyanid in slight excess so as to just dissolve the precipitate. It is well known that such a solution contains the ions + K and — AgCn; that is to say, there are almost no silver ions present in such a solution, the silver being combined with the Cn radical to form the complex ion AgCn. It was found that such a solution containing as much as 1–12800 gram-equivalent of silver per liter still allowed the plants to grow. The copper salts, the sulphate, chlorid and acetate, all gave the same concentration limit, viz., 1–25600 gram-equivalent per liter. There can be no doubt that here the copper present does the work. A Fehling's solution contains copper but, as has been recently shown, is poor in copper ions. We found that a Fehling's solution containing 1–200 gram-equivalent of copper per liter still allowed growth. This Fehling's solution was not made in the usual way, but, to avoid the presence of salts in overabundance, cane sugar, copper sulphate and just enough caustic potash to dissolve the precipitate were mixed.

The limit for cobaltic nitrate and cobaltic sulphate was found to be again at agreement at 1–12800 gram-equivalent per liter. This is a measure of the poisonous effects of cobalt ions. The corresponding limit for nickel ions is 1–25600 gram-equivalent per liter.

From Table II, the corresponding figures for Fe ions is 1–12800 gram-equivalent per liter; for cadmium, 1–102400, for mercury, 1–12800; HgCn is toxically more active because the Cn ions in themselves are poisonous as is also the undissociated $HgCn_2$.

In the case of silver and copper, it has already been shown that when these metals are present in the solutions in compound ions the toxic action is much diminished. When to mercuric chlorid, dextrin in excess is added and then enough caustic potash to precipitate the mercury present under ordinary conditions, no precipitate forms. We have here, as it were, a Fehling's solution containing mercury instead of copper. The mercury is not present in the solution as ion but is bound to the dextrin with which it forms a complex ion which is of much less poisonous action than the mercury ion. Indeed, such a solution as that just described may contain 1–3200 gram-equivalent of mercuric chlorid and still permit growth. The corresponding limit for mercuric chlorid alone is 1–12800 gram-equivalent per liter, or one-fourth as strong.

The results obtained with iron salts are of interest. Dialyzed iron chlorid containing 0.0477 grams of Fe and 0.0047 grams of chlorin per liter, just allowed plant growth. A solution of ferric chlorid first allowed growth at a much greater dilution. The limit-concentration contained 0.0025 grams iron and 0.0047 grams chlorin per liter. The dialyzed iron contains hardly any ferric ions as is shown by the fact that potassium ferrocyanid produces no precipitate in such a solution.

Again, solutions of potassium ferrocyanid contain K ions and $FeCn_6$ ions; potassium ferricyanid solutions contain K ions and $FeCn_6$ ions. Here we get the effect not of the Fe ions, nor of Cn ions but of the complex ions mentioned. These are weak toxically as shown by the fact that in potassium ferrocyanid solutions lupines live in a concentration of 1–200 gram-molecule per liter.

These results are collected in Table III.

TABLE III.

METALS IN COMPLEX IONS.

Substance.	Limit.
$AgNO_3$	1–12800 grm. equivalent per 1.
$HgCl_2$	1–3200 " " "
$CuSO_4$	1–200 " " "
K_3FeCn_6	1–200 " " "
K_4FeCn_6	1–200 " " "
$FeCl_3$	
Fe.	0.0477 " " "
Cl.	0.0047 " " "

METALS IN SIMPLE IONS.

Substance.	Limit.			
$AgNO_3$	1–204600	grm.	equivalent	per 1.
$HgCl_2$	1–12800	"	"	"
$CuSO_4$	1–25600	"	"	"
KCn	1–6400	"	"	"
$FeCl_3$				
Fe	0.0025	"	"	"
Cl	0.0047	"	"	"

Here the decided contrast, at times very striking, speaks for itself.

These results have in a large measure been confirmed by Mr. F. D. Heald, Fellow in Botany at the University of Wisconsin, who investigated the action of like substances on various other plants.

That the modern theory of solutions would throw light on the physiologic action of solutions was to be expected. We have shown that, in the case of plants, solutions of the electrolytes derive their toxic action from the ions into which they split up in great dilutions, the undissociated parts coming into account only when dissociation is not practically complete. We have here a recognition of the theory of electrolytic dissociation by the organic world. Any one inspecting Miquel's table of the efficiency of antiseptics in Sternberg's "Manual of Bacteriology" at the same time bearing in mind the theory of Arrhenius will, although concentrations are given by per cent. instead of chemic equivlents, be able to see the corroboration of this view.

In seeking to apply this modern theory of solutions to the physiologic action of the same, we have dealt only with the higher plants thus far. Investigations along this line in bacteriology are now in progress at the University of Wisconsin, and their extension to animals is contemplated.

By working along this line, it is hoped to place the knowledge of the physiologic action of solutions of electrolytes on a better basis than the empirical one on which it has thus far rested. It seems not too much to expect that the effects of such study will be felt in agriculture, whereas its application to bacteriologic study will be highly important to our knowledge of antiseptics. The systematic study of the effects of solutions on animals from the standpoint of the new theories bids fair to yield results for the therapeutist. For example, if, as we have found, silver ions are very harmful to plants, then we can readily see why silver foil placed upon a wound should act as an antiseptic. The small amount of silver ions that are formed, suffice in cases to prevent putrefaction.

It is clear that the mere presence of a metal in a solution does not warrant us in drawing conclusions concerning its physiologic strength; we must also know whether the metal exists in the solution as simple ions or combined with other radicles to form a complex ion. If the addition of certain substances to a solution containing a physiologically active ion forms a complex ion of much less powerful action, it follows that these additional ingredients give us a means of reducing, so to speak, the physiologic action of the simple ion.

This paper is intended simply as a preliminary report on the work already done. The results are soon to be published in full together with the details concerning the methods employed. We shall also take this opportunity to call attention to the further applications of this view of solutions to physiologic problems.

JOINT PHARMACOLOGIC INVESTIGATIONS BY THE AMERICAN MEDICAL ASSOCIATION AND THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Read in the Section on Materia Medica, Pharmacy and Therapeutic at the Forty-seventh Annual Meeting of the American Medical Association held at Atlanta, Ga., May 5-8, 1896.

BY H. H. RUSBY, M.D.
NEW YORK.

When one examines the pharmacologic portions of the many ponderous volumes composing the index to the Surgeon-General's library, and those of the Index Medicus, by which the former has been succeeded, remembering that a very large part of pharmaceutic literature is not here represented, the conviction is forced upon him that our knowledge of the practical utility of medicinal plants is small beyond all reasonable comparison with the amount of time that has been bestowed upon their study. This fact is not difficult to explain, at least in part. It is largely due to the method, or rather want of method which has prevailed, by which partial investigations have been made by individuals without regard to their relation to the complementary parts, these being left undone, the part performed remaining unutilized and becoming finally buried and forgotten. This neglect has been made farther operative by the habit of investigators of failing to search the work of previous investigators in the same lines before performing their own portion, so that the same work has been duplicated over and over again, and in such a way as not only to fail of confirming, refuting, or of supplementing conclusions already reached, but in very many instances of unnecessarily and mischievously coming into conflict with them. This charge against investigators is fully and eloquently sustained by the small subscription list of the Index Medicus for many years past, throughout its entire history in fact. No class is more culpable for this neglect than medical editors, whose duty of criticising and weeding out contributions on these lines has been almost utterly neglected. This again is in a large degree due to the great number of medical journals, run almost confessedly for the most part as advertising sheets, and recognizing quantity with little regard to quality in the contributed matter.

An almost equally responsible factor is the narrow view which physicians, and especially medical teachers, have been taking of their responsibilities in the department of pharmacology. In leaving to the pharmacist the practical details connected with botany and pharmaceutic chemistry, they have gone to the extreme of ignoring these subjects almost altogether in principle as well as in fact, and have as an inevitable consequence become incapable of utilizing the rich materials which have been placed within their reach by pharmaceutic investigators. In the investigation of pharmacology pharmacy has, during the last decade, very far outstripped medicine. "Why does not the medical profession catch up," would have been a very pertinent, even if not wholly respectful title for this communication.

The joint section of materia medica and therapeutics of these two associations, which section should change its name to "The Joint Section of Pharmacology," is altogether the most competent and appropriate agency for correcting the defects to which ref-

erence has been made, and it is this which constituted the chief hope in its establishment by its leading promoters. To the great majority of observers in both professions it has never appealed from this standpoint. They appear to have seen in it merely an influence for the promotion of cordiality between physicians and pharmacists, either from sentimental considerations merely, or to accomplish the negative result of checking the friction which was apparent in certain quarters.

In this direction it has justified our expectations and we are satisfied that it has proven a success. But it must begin to do something more positive if it would not soon begin to act as a dead weight. This is to promote a new method of undertaking and carrying out pharmacologic investigations.

When the writer expected to act as chairman of the delegation from the American Pharmaceutical Association to this meeting, he planned to propose certain changes, having this object in view, in the manner of carrying on our joint work. Although absence prevents his official action in this direction, it appears desirable that his ideas should be informally presented.

The chairman of this Section and that of the delegation have followed the ordinary custom in such bodies, of contenting themselves with attending to the routine business of their offices and issuing general invitations to the members to present contributions. As a result the proceedings have been somewhat heterogeneous in character. While it is desirable that members should be left free to select any subjects they prefer, and while nothing could or should be done by a chairman to deter any one from so contributing, yet it would seem very desirable that at a meeting so peculiarly adapted as this is to the performance of joint work, some such work should be specially arranged for in advance by concerted action by the two chairmen. The chairman of the Section is elected at the preceding meeting, but the chairman of the delegation is appointed by the president of the American Pharmaceutical Association, and it has not been customary for this appointment to be made until quite late in the year. Selection of the delegates has thus to be made by correspondence, extending often over a long period, and when arrangements are perfected there is no time left for special investigation work to be done by the members of the delegation, of such a character that it would fit with related work done by the members of the Section.

The writer would therefore suggest that the president-elect of the American Pharmaceutical Association should appoint the chairman of the delegation during the session of the American Pharmaceutical Association at which he is elected, and that chairman should proceed immediately to act with the president in making up a list of delegates. The chairman should then at once confer with the chairman of this Section in regard to undertaking one or more definite pharmacologic investigations, to occupy one or more members of each of the contributing bodies. The members to do the work should be selected and after acceptance should place themselves in correspondence with one another for carrying out the work in a manner calculated to reach some definite and completed result.

An instance of failure in such an attempt in the case of the present meeting will illustrate the principle involved. It was the desire of the writer to have the subject of the viburnum barks investigated. A thorough chemical study of V. prunifolium was first to be made and the constituents isolated in sufficient quantity to admit of physiologic experiment by some member of this Section. The active constituent or constituents being thus determined, the related species were to be examined with reference to the possession of such constituents, as well as of others, so that a just conclusion could be reached as to their claims for recognition by the Pharmacopeia and, if recognized, then as to their recognition separately or under one definition. When the attempt was made to put this plan into execution, it was found impossible to complete the work in time for the meeting, though this would have been possible had it been started at the beginning of the preceding year. There is no reason why such a plan of work by the proposed method should not run through two or more years, if its completion in one year were found impracticable. The writer believes that important practical results would follow the adoption of this plan, or some modification thereof.

PRESCRIPTION WRITING AND PHARMACY AS PRACTICED IN OUR LARGE HOSPITALS AND DISPENSARIES.

Read in the Section on Materia Medica, Pharmacy and Therapeutics, at the Forty-seventh Annual Meeting of the American Medical Association, held at Atlanta, Ga., May 5–8, 1896.

BY HENRY R. SLACK, PH.M., M.D.
SECRETARY GEORGIA BOARD OF PHARMACY.
LA GRANGE, GA.

My attention was first directed to this subject by an editorial in the *American Medico-Surgical Bulletin* from the able pen of Dr. Wm. Hy. Porter, in which he very forcibly portrayed the evil of stock prescriptions in the hospitals. At first I rather thought, that like most reformers, he had represented the practice and the evils thereof in somewhat extravagant terms, but closer personal observation has convinced me of the correctness of his views.

Vibration is nature's law; everywhere do we notice action and reaction, condensation and rarefaction, crest and trough. Even the forces that apparently move in straight lines, when more closely studied, are found to be an aggregation of an infinite number of minute vibrations too small for the unaided eye to measure.

The noble art and science of medicine is no exception to nature's law of vibratory motion; indeed, notwithstanding her boasted conservatism she is largely the creature of fashion. Fortunately for suffering humanity, her styles do not change quite as often as the seasons, and when they do, there are usually a few facts, some reasons and more theories to explain the revolution than are produced in defense of the cut of a coat; but the reaction comes just the same.

At present we are in the midst of a season of expectancy, as a natural reaction from the polypharmacy hypertherapy of the past. Serotherapy and animal extracts seem to be the coming fad, though the quackish methods adopted by some of its promoters and manufacturers have somewhat chilled the ardor of the regular profession. It matters little whether we float on the crest of expectancy or struggle in the trough of empiricism, we find good company in both situations. Hippocrates and Celsus, Trousseau and Sydenham, Chapman and Todd, Osler and Wood represent different ideas in medicine, but are names we all honor. Wherever we are, let us "act well our

part, for there all the honor lies." Whether clinicians or therapists, when medicines are used the prescriptions should be properly written and accurately filled.

Four months spent as a student and visitor in the largest and best equipped medical colleges and hospitals in New York, Philadelphia and Baltimore, has convinced me that there is more room for improvement in prescription writing and pharmacy than in any other art there practiced.

Being interested in this department, I visited the pharmacies of these colleges and was surprised at the careless, almost slovenly, manner in which the prescriptions were written, and as might be expected, the filling was no improvement on the writing.

Analysis of 100 prescriptions found on the files of each of the five leading colleges in the East and three in the West may be of interest.

	Metric system used.	Correctly written.	Incorrectly written.	Symbols.	Stock ℞.
A.	0	52	48	45	45 Pa.
B.	6	64	36	36	36 J. H.
B.Dis.	4	33	67	65	65 J. H. D.
C.	0	90	10	3	13 Jef.
D.	5	96	4	2	6 P. G.
E.	1	98	2	0	2 P. C.
			Western Colleges.		
F.	40	65	35		90 N. W.
G.	8	33	67		3 P. G.
R.	0		All symbols.		100 R.

The analysis of the prescriptions from the western colleges were made by my friend and pupil, Mr. W. S. Davis, now a student in Chicago.

From a consideration of these figures it will be seen that the art of prescription writing is rather below par, even in our oldest and youngest and strongest medical colleges.

Although the physicians are presumed to be familiar with the metric system, it is used in less than 3 per cent. of the prescriptions filled in the eastern hospitals. In this respect the West shows her progressive spirit, for there we find the metric system used in 24 per cent. of the prescriptions. The conservatism and training of the East shows in the correctness of the prescriptions as written, for here we have 72 per cent. correct while in the West only 49 per cent are placed in that column. How far short are our colleges and hospitals in both sections in this important particular appears when we consider that nearly one-third of all the prescriptions are incorrectly written.

The chief error lies in the careless use of symbols, not chemic, but abbreviations understood only by the pharmacist, standing for some stock prescription, such as:

℞ H. S. ℥i

for

℞ Hydrargyri bichloridi 0.065
Potassii iodidi. 30
Aquæ puræ, q. s. . . . . 30 c.c.
Mix. Sig.

or

℞ M. G. A.

for one of Dr. Pepper's favorite prescriptions:

℞ Tr. nucis vomicæ . . . . . 4 c.c.
Tr. gentianæ co. . . . . 45 c.c.
Sodii bicarbonatis. 8
Aquæ menthæ pip., q. s. . . . . 180 c.c.
Mix. Sig.

Using signs and stock remedies gets the prescriber into the very careless and harmful habit of fitting his symptoms to his remedy, instead of the treatment to the disease. This is one cause of the rapid growth of that most injurious form of all nostrums, so-called physician's formulæ, the ingredients of which are not known either to the physician or the pharmacist, and are used to the detriment of the former's brains and self-respect, and the latter's skill and profit.

This careless prescription writing is an injustice to the students, especially the post-graduates, many of whom graduated five or ten years ago, when only two courses were required. These men, feeling the deficiency in their early training, or wishing to brush up in some particular branch, go to the large schools and hospitals for thorough training and instruction. Imagine their surprise when after a half hour's thorough examination of blood, heart, lungs, liver, stomach and kidneys, a prescription is hastily scribbled off thus:

℞ M. G. A. . . . . ℥iv
Sig., ℥ii t. i. d.

S. M.D.

Inquiring as to what these cabalistic letters represented, they receive the following reply: "Oh, that is a splendid thing for stomach troubles, and Dr. M. has made quite a reputation by its use. It contains some tr. nux vomica, gentian, soda, etc., but I have forgotten the proportions. You can find out from the pharmacist." "Doctor, wouldn't a little sanguinaria be beneficial in his case?" suggests one of the post-graduates. "Yes, I think it would, but we haven't time to write individual prescriptions for each case."

Thanking the interne or instructor for his kindness, they go to the pharmacy. This seems to be against the rules, but one of their number is an alumnus of the same college of pharmacy as the pharmacist, so they gain admittance. There they find a very intelligent Ph.G. busily engaged in mixing medicines by the gallon, and from these large bottles bearing the cabalistic signs he fills a dozen or more one, two or four ounce vials, which he corks and puts in rows ready for the labels. When asked for the U. S. Pharmacopeia he did not have one, but gave us instead a sixteenth edition of the U. S. D., a book nearly ten years behind the times. No metric weights were visible and only two metric graduates. When asked about this deficiency, he said: "Only one man in this hospital, Dr. T., uses the metric system in his prescriptions, and for these I can use fifteen grains for the gram." One of the company expressed disappointment at the neglect of the metric system by a school where so many of its teachers were graduates of European universities, and one whose name stood for progress in every department of university education; and they went to the pharmacy of the hospital proper. Here they found a younger man in charge, also metric weights (though very little used), a U. S. Pharmacopeia and some other standard works on pharmacy.

The other pharmacies visited revealed nearly the same condition of affairs, though three were not so bad for stock prescriptions, and one presided over by a doctor of pharmacy was well arranged and properly equipped.

In three out of five were found the U. S. P. and the U. S. D., and in two the Nat. Dispensatory. In all but one there was great room for improvement It is to be hoped that our colleges now requiring four years instruction will teach their graduates to write their prescriptions correctly and the use of the metric system. At present, prescription writing and phar-

macy, as practiced in our large college hospitals and dispensaries, leave much to be desired by way of improvement.

STANDARDIZED DRUGS.

Read in the Section on Materia Medica, Pharmacy and Therapeutics at the Forty-seventh Annual Meeting of the American Medical Association, at Atlanta, Ga., May 5-8, 1896.

BY HENRY B. GILPIN, PH. G.

BALTIMORE, MD.

It is interesting to study, in the evolution of the methods of drug administration, the various forms that have obtained. Beginning with the crude drug, the first step apparently was the recognition of the fact that, as a rule, the soluble principles of a drug of vegetable origin, were its therapeutically active ones. Hence it was but natural that solutions—made with hot or cold water—in the form of infusions, decoctions, etc., should have resulted. It was found, however, that the proneness of these to decomposition, and the relatively large doses necessary to secure therapeutic effects, made them objectionable. The next step was the making of tinctures, fluid extracts and similar products. The final advance has been the assaying or standardizing of the more prominent drugs and galenical preparations, such as those of cinchona, opium and nux vomica, as directed by our Pharmacopeia, and a score and more of other alkaloid-containing drugs that manufacturers themselves have adjusted to certain standards.

In these days of scientific accuracy, it would seem hardly necessary to put forth any plea in favor of standardized drugs, and yet the variability in active constituents of what are commercially regarded as good-quality drugs, makes it essential that the agitation in favor of higher standards be continued. It may be of interest to state that in over 500 assays made of six prominent drugs—which, by the way, were of the *best* commercial quality—the following percentages of alkaloids were obtained:

Aconite root 0.21 to 0.80 per cent., belladonna leaves 0.23 to 0.50 per cent., conium fruit 0.10 to 0.53 per cent., hyoscyamus leaves 0.11 to 0.20 per cent., nux vomica 1.6 to 3 per cent., gelsemium root 0.3 to 0.4 per cent. What is true of variations in strength of these drugs is equally true of many others. From the above it will be seen that the varying alkaloidal strength between extreme limits in the above mentioned drugs, is sometimes several hundred per cent; notably is this the case with aconite root. For example, to illustrate the possibilities of this variation: *two* minims of an unassayed tincture of aconite, in one case, may have the same amount of alkaloids as *eight* minims of a tincture made from another crude root. Five minims of a tincture of belladonna made from an unassayed drug may have only *one-half* the alkaloids contained in the same amount of a tincture made from another sample, or, if it be required to give *ten* minims of tincture of nux vomica, the unassayed product may contain only *one-half* the alkaloids it contains at another time. In other words, there is no safety for the physician in unassayed drugs; he must have the most uniform and reliable tools with which to work, or he will measurably fail. This is true for a number of reasons, the main one of which is, that practical medicine is not an exact science. The medical man has to deal with conditions that are far from being exact. "The human body is a wonderfully intricate piece of mechanism with such various and varying factors to govern its cellular activities that rational medical practice can only develop most slowly." Now, if with the factor of a varying human economy the physician has to deal with varying drugs and preparations of drugs, he is doubly handicapped in his work. If on the other hand, he can be assured that the means he wishes to employ to combat disease are always definite and sure, he can ignore the factor of a possible variation in the strength of the drug as an explanation of its want of action, and assume that the use of the drug itself was not indicated, because its use failed to give certain results. But when he uses a drug of unknown strength, and fails to produce certain results he may be in doubt as to whether it was the fault of the drug, whether it was not pushed to the full limit of tolerance, or whether its application was not indicated.

So, from every point of view, the physician should be interested in obtaining the best and most uniform drugs, if he wishes to obtain, as far as possible, the best and most uniform results in medical treatment, and in this connection let me say, that the educated pharmacist is just as anxious as the physician to have products that shall be reliable and uniform.

What is true with regard to the value of accurately assayed drugs, is also true with regard to the value of accurately assayed preparations of drugs. Whether it is better for the pharmacist to buy assayed drugs, and make his own tinctures, fluid extracts and the like, or to buy the assayed preparations of a manufacturer, is a question to which we think, there can only be one right answer. It is better for the pharmacist to buy assayed drugs, and make his own preparations, for the reason that it encourages the development of legitimate pharmacy—gives the pharmacist a deeper knowledge of the drugs he is handling—and he can personally guarantee the quality of his products. He can not personally vouch for the quality of another's preparations. It may be retorted that the pharmacist can not vouch for the strength of commercially assayed drugs, but he has this advantage: he can readily verify the claims made, and make a physical inspection of the products before converting them into preparations. When he buys a fluid extract, he buys a finished product, and knows nothing of the physical condition of the drug from which it may have been made.

But whatever difference of opinion may obtain concerning this point, there can be little question as to the reprehensibility of the practice sometimes followed by pharmacists of making tinctures by simply diluting fluid extracts. Fluid extracts, assayed or unassayed, differ from tinctures in the relative amount and kind of their proximate principles, and while it may be possible to so adjust the alkaloidal strength of a diluted fluid extract to make it correspond to the proper alkaloidal strength of a tincture, it is not possible to so adjust the *other* proximate principles, because in the vast majority of cases, there exists no known methods of assay for them. Further, that tinctures contain relatively a *larger* amount of proximate principles than do fluid extracts, is shown by the fact, known to every physician, that the *dose* of a drug in the form of a tincture is *less* relatively than is the *dose* of a fluid extract, and exhibits the physiologic effects of the drug in a correspondingly less dose.

The increased use of synthetic chemicals and the

decreased use of tinctures of vegetable drugs, by the physicians of to-day, may be due, in part, to the fact that some pharmacists buy commercial fluid extracts and make tinctures from them by simple dilution with varying quantities of alcohol and water, instead of using, as the Pharmacopeia directs, drugs with which to make them; and physicians have failed to achieve the results recorded by their forefathers. Modern physicians have thrown aside the old and tried, to welcome the new synthetic compounds; but in so doing, is it not possible that the old may possess merits that make them equally as worthy as the new, if not more so?

THE McINTYRE ELEPHANTIASIS CASE.

BY G. LAIDLAW, M.D.
CHICAGO.

In this world of phenomena it is not strange that a physician and surgeon, practicing his profession for a number of years, should occasionally meet with pathologic conditions more or less rare, but it is strange that some should meet the most remarkable cases at every turn, so to speak. In this connection I am sure that it is the privilege of very few professional men, outside of very large hospitals, to deal with more extraordinary cases than have come to the notice and care of my much respected friend and colleague, C. J. McIntyre, C.M., M.D. As a partial proof of the foregoing assertions, I take great pleasure in presenting to the reader four different views of a patient whom the doctor has had for several years, together with a few brief remarks upon the history of this particular case and the disease with which the lady is afflicted.

The good-natured, intelligent and respectable woman, who so kindly allowed us to divest her of all metallic substance and garments and pose before the searching eye of the camera obscura, that by so doing we might obtain further light in medicine and be able to present to your view these pictures from life, is a native of America, and was born in Wisconsin. She is now 45 years of age and the mother of ten children, to five of whom she has given birth since the disease from which she now suffers began.

Eighteen years ago, while engaged in a laborious task, she sustained an injury of the abdomen, near the umbilicus, which was followed shortly after by chills and vomiting. The cutaneous and subcutaneous tissues of the affected part presented redness, tumefaction and infiltration. In a short time the acute symptoms disappeared, leaving a well-marked hypertrophy, which gradually increased until two years later, when the left leg began to be covered with scales and to enlarge somewhat. She was at this time in the fourth month of gestation with her sixth child. The abdominal trouble grew gradually worse, but the leg remained in about the same condition until seven years later, when she fell from a step-ladder and sustained a wound from a rusty nail on the right leg, just above the ankle, where, by reference to Figures 1 and 2, the mark of its point of entrance may still be seen. This accident occurred on July 5, and on August 15 she was attacked with chills and vomiting. The seat of the wound burned and throbbed and her suffering was great. The symptoms, as she described them, appear to have been those of tubular lymphangitis. At the end of two months from the date of the accident she had recovered from the lymphangitis and, as she remarked to us when relating the history as above, "was ready for more trouble." She did not have long to wait, for in November of the same year she again fell, this time into a register hole, and wounded her left leg, which, as we have stated, was the one on which the scales appeared two years after the abdominal injury. For a third time she was attacked with chills and vomiting, on the second day after the fall. Her physician pronounced the case, when he saw it, one of erysipelas. The entire limb from toe to knee was involved, and she was very ill for four months. The tissues never returned to their normal proportions, not even to the size which they were when the accident occurred, but, on the contrary, continued to increase in size, the trouble extending all the while further and further up the limb.

Some time after this, but just how long the patient does not remember, the right leg, which had been injured by the nail, began to enlarge.

We have now passed roughly over the first ten years of the history of this case, giving the story substantially as the patient related it from memory.

Dr. McIntyre began to see the case about this time and has now been the patient's physician for about eight years, during which time he has had to deal with indolent, unhealthy and ever-increasing ulcers, the secretions from which have been composed of serum and pus, and very disagreeable to the sense of smell. The epidermis has at times become fissured and cracked; papillomatous excrescences of no mean size, made up of conglomerations of many smaller ones, have appeared, while the lymphatics have exuded lymph in large quantities. When the fissures and ulcers have reached deep-seated nerves Dr. McIntyre has had to assuage the great pain which the patient would experience; and there have appeared at many places, but particularly on the inner aspect of the left leg (seen in Fig. 2), quite large and deep-seated abscesses, calling for evacuation and the institution of proper treatment to prevent septic absorption. Meeting all indications as they have arisen from time to time, and supporting the patient in a proper manner amid conditions which at times have seemed hopeless, Dr. McIntyre has cared for the patient until now, when the case has assumed an insidious and chronic form. Large areas of vessels have become affected, and such wide-spread obliteration of them has resulted as to block up permanently their flow of lymph, thereby producing an everlasting lymphedema of the affected parts. From the history of the case it would appear that there resulted from the abdominal injury many years ago an ordinary erysipelas or reticular lymphangitis, and that from the invasion of the lymphatic channels at this time the disease dates. Later on we find one leg affected with eczema, the other with a septic wound, and finally, the eczematous one, after an injury, becomes the seat of a traumatic erysipelas. At these three seats of original attack there have occurred successive attacks of diffuse lymphangitis, each recurrence causing an aggravation of the already bad condition. Thickening and induration of the skin and connective tissue have taken place, the dilatation and multiplication of the blood vessels keeping pace with the general connective tissue hypertrophy, until we have now a case of elephantiasis Arabum which, in some respects at least, is the most wonderful on record. In support of this last remark I wish to state that it has been made after a careful examination of a great many works

on the subject under discussion, among which may be mentioned those of Hebra, Neumann, Kaposi, Ziemssen's Encyclopedia (the volume on Skin Diseases), Crocker, the London *Lancet* since 1878, A. H. Buck's Refer. Hand-book Medical Science, Keen and White's American Text-book of Surgery, Hooper's Dictionary, published in New York in 1847 by Harper & Bros., Stephen Smith's Surgery, Dr. Titley in the *Lancet*, Vol. xx; M. Clot-Bey, A. J. Howe, etc. Felkin's case in the *Edinburgh Medical Journal*, 1889, page 779, is the only case I have found which very closely resembles the McIntyre one. In this instance the patient was an Eurasian woman.

In a general way I may close my remarks regarding this case by saying that the patient is a most hopeful, good-natured and happy woman, who, if it were not for

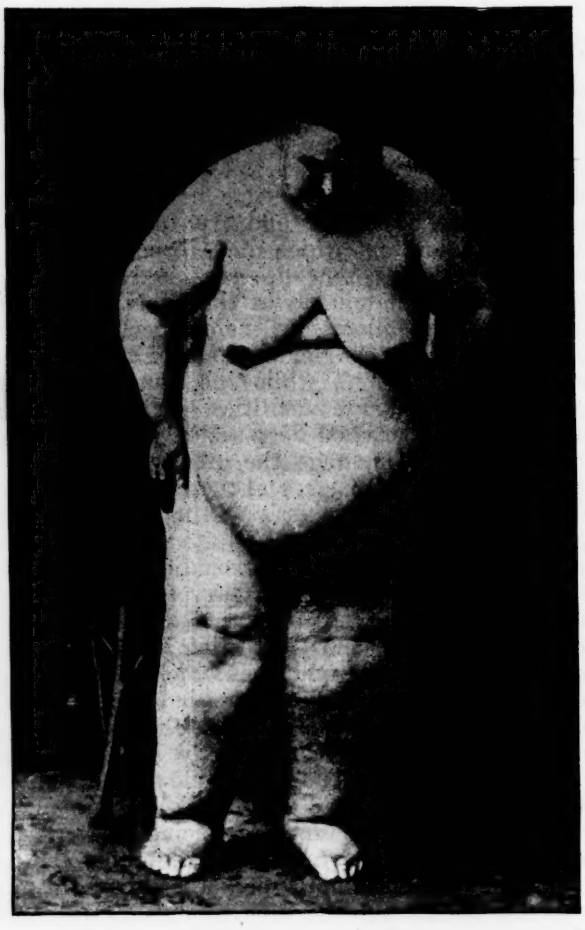

FIGURE 1.

the asthma, with which she has suffered much at times for the last six years, would not complain at all, notwithstanding the fact, that in addition to her terrible state, she has no husband to care for her and is in the most destitute circumstances, with several children still requiring the care that none but a mother can bestow.

By reference to Figs. 2 and 3 a very interesting demonstration of a commencing lymphangiectasis may be seen on the lower part of the abdomen near the line of the groin. This condition is to the lymphatic vessels what dilatations and varicosities are to their congeners, the veins, and should the condition here seen, by confluence and aggregation, form distinct tumors, we will have what is called lymphangioma.

Extending downward from the umbilicus, corresponding to the linea alba, there is at present a fissure about four inches in length and two and one-half inches in depth (best seen in Fig. 3), the sides of which are in a state of ulceration and discharge a disagreeable-smelling mixture of serum, pus and lymph. During the past year the labia majora and minora and clitoris have become involved, but are not as yet enlarged to any great extent, in fact, there is no chance for any considerable enlargement, for the abdomen as it hangs, or rather protrudes, downward is as stiff and unwieldy as any elephant's belly on earth. To the sense of touch, moreover, there is nothing that I know of which feels more like the hide of an elephant than this does. There is very little

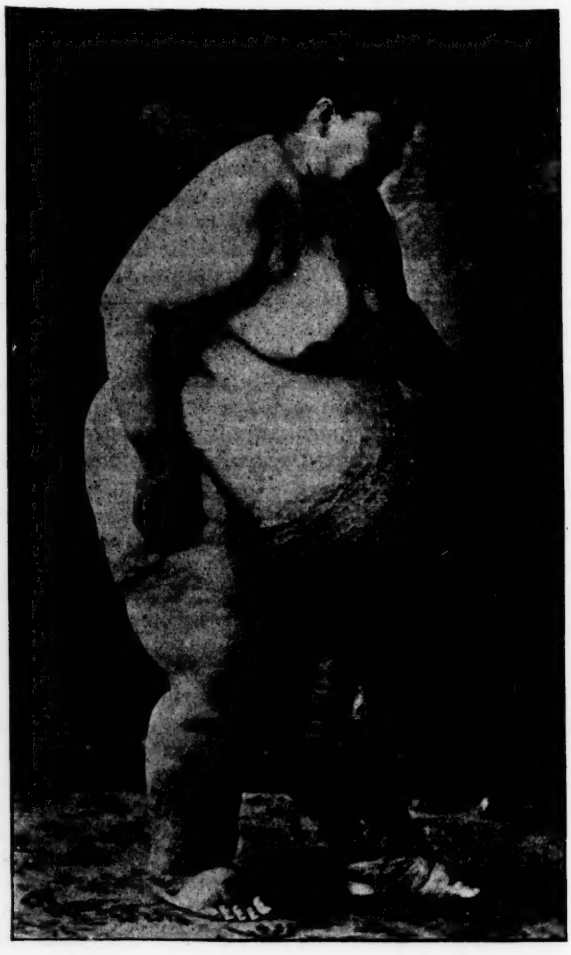

FIGURE 2.

feeling in this thick, rough, wrinkly, unctuous and void-of-hair skin. In the edema produced by other diseases and other causes there is pitting on pressure, but no part of this growth pits, even when great pressure is applied. The blood recedes to quite an extent from the point of pressure to return very slowly, indeed, but that is all.

While elephantiasis Arabum, the synonyms of which are pachydermia, Dal fil, Barbadoes leg, Elephantenfuss, mal de Cayenne, etc., may be considered a pandemic disease, we must consider it when appearing in this climate and from the causes which appear to have been responsible for it in this case, a very sporadic malady. Authors of the present day speak of elephantiasis Græcorum as lepra, and elephantiasis

Arabum as simply elephantiasis or pachydermia, it being now certain that the two are distinct. I think that when we have a case like the one under discussion and springing up in this part of the world from causes similar to those which appear to have been at the bottom of this case, the simple term lymphedema would be the best to employ, reserving the terms elephantiasis Græcorum for the lepra type, and elephantiasis Arabum for those cases found in hot climates near the tropics, particularly in Egypt, on the coast of the Mediterranean, the west coast of Africa, the Antilles (Barbadoes), Brazil, Malabar and parts of India, in all of which sections of the world it is most often met with and where, almost always, the cause of it is the entrance into the blood and lymphatics

FIGURE 3.

of the embryo of a nematode worm, the name of which is filaria sanguinis hominis, from its discovery in the human blood. For much of our knowledge in regard to this we are indebted to Wucherer, Salisbury, Lewis, Bancroft, Manson, *et al.*

With us in this country the disease probably always appears after chronic or frequently repeated acute inflammations of the blood and lymph vessels or anything which hinders the flow and favors the escape of the lymph in the lymphatics; and whether it be produced by an inflammation of the blood vessels or of the lymphatics themselves, or from external pressure, it matters not, we will have lymphedema, and following it there will be cell-proliferation and consequent increase in the surrounding tissues.

In tropical countries, but particularly on the Guinea Coast of Africa, the home of the filaria sanguinis hominis, every native into whose lymphatics the filaria gains entrance is not affected with elephantiasis. In some it produces chyluria, and in some it does not appear to affect the health at all. This fact, therefore, goes to prove that there is not in this parasitic worm, *per se*, any special poison the presence of which is necessary in order that either chyluria or elephantiasis may exist. For, unless the parasites block, by their presence, the lymph channels, there will not be chyluria; and unless they develop in sufficient numbers to produce stagnation in the lymph vessels, there will not be, from them at least, an elephantiasis. It

FIGURE 4.

is, therefore, apparent that it is not necessary that we should have in this country, in order to produce genuine cases of chyluria or elephantiasis, the worm which Manson has so well studied for us, and we do not believe that the filaria sanguinis hominis had any part in the cause of the McIntyre case which we have just reported.

Manson says that this parasite resembles a delicate thread of catgut, animated and wriggling; and W. Essex Wynter tells us that the female has a diameter of about 1–100 of an inch and a length of 3 to 3½ inches. As yet no perfect specimen of the male has been found. The mouth is circular, without papillæ; there is a narrowing at the neck, and the tail is bluntly pointed. The parent worm is necessarily only found during operations involving the affected tissues, or in

autopsies. On the other hand, the embryos occur in immense numbers and are readily found in blood obtained by pricking the skin. They appear as active organisms, each being contained within a delicate sheath which projects slightly at one or the other end of the worm. Its length is about 1–90 of an inch and its diameter 1–3200.

Dr. Manson obtained ova consisting of oval bodies 1–500 by 1–750 of an inch. These are too wide to traverse the channels of the lymphatics and consequently become impacted and thus give rise to the conditions of elephantiasis and chyluria.

The mosquito plays a part in the spread of this disease in hot climates. Dr. Stephen Mackenzie's experiments showed that the embryos only occur in the cutaneous vessels while the patient is asleep, whether by night or day. As to what becomes of them during the period of activity of the patient nothing certain is known. During sleep, however, while the filaria embryos circulate in the blood of the sleeper the mosquito fills himself with the infected fluid and flies to some stagnant pool of water, his natural haunt, upon the surface of which he drops to die. The embryos of the filaria contained within the blood are thus set free and become ready to enter the circulation of the next thirsty mortal who drinks the water.

THE METHODIC DESCRIPTION OF A SURGICAL DISEASE.

BY EDMOND SOUCHON, M.D.

PROFESSOR OF ANATOMY AND CLINICAL SURGERY, TULANE UNIVERSITY, NEW ORLEANS, LA.

(*Concluded from page 83.*)

FORMS, VARIETIES, COMPLICATIONS AND RECURRENCES.

The description of the forms, varieties and complications of the disease comprises that of all the points and features which are not commonly met with and the description of which would embarrass or obscure the description of the most common or frequent appearance of the disease.

Those forms, varieties and complications must be stated as due to peculiar causes; to pathologic peculiarities, to peculiar symptoms, course, termination, duration, diagnosis, prognosis, complications, relapses, sequelæ or consequences. Complications may be local or regional or general. The local and regional complications may be due to malformation, to softening, induration, neurosis, injury, congestion, inflammation, gangrene, ulcer, fistula, tumor; they may affect the skin, connective tissue, adipose tissue, tendons, muscles, fascia, periosteum, bones, medulla, arteries, veins, capillaries, lymphatic vessels, lymphatic glands, nerves, an organ special to the region. The general complications may affect the organs of circulation, respiration, etc. For each form, variety or complication state the frequency and importance.

METHODIC DESCRIPTION OF THE LOCAL SYMPTOMS FURNISHED BY THE SIGHT, TOUCH, HEARING.

The methodic description of the local symptoms furnished by the sight, touch and hearing are much facilitated by arranging them methodically according to each disease or group of diseases. Hence the following separate methodic descriptions:

The classification here adopted and advocated is based on the clinical manifestation which is visible and at once recognizable by the student, and which leads to the pathologic and etiologic characters which themselves lead to the diagnosis, prognosis and treatment.

These diseases are: Malformations, injuries, neuroses, softenings, indurations, congestions, inflammations, gangrenes, ulcers, fistulæ, tumors.

They may affect the skin, connective tissue, adipose tissue, tendons, muscles, fasciæ, periosteum, bones, medulla, joints, arteries, veins, capillaries, lymphatic vessels, lymphatic glands, nerves, an organ special to the region, in all or only one of its component parts.

This plan corresponds to descriptive anatomy, a fair knowledge of which is previously necessary to study profitably general anatomy, which studies the tissues and organs of the same nature regardless of their situation and relative position. The same, in the study of surgical diseases, a descriptive and clinical knowledge is necessary before undertaking the study of the diseases from the point of view of causes or nature, irrespective of the clinical forms they may assume and the location they may affect, such as diatheses, gout, struma, tubercles, syphilis, etc. It would seem that the study of the general diseases should precede the study of their local manifestations, but experience teaches that that study is much more profitable after some clinical knowledge has been acquired.

We must here beg for indulging in repetitions which can not very well be avoided in a new subject where clearness and precision must have precedence over style and grace.

METHODIC DESCRIPTION OF FUNCTIONAL SYMPTOMS.

The methodic description of functional symptoms comprises the following features:

1. The alterations in the physical, *i. e.*, mechanical phenomena of the functions; they usually consist in alterations of movements, *i. e.*, contractions of the muscular fibers of the part or of the organ. We must state the alterations in the capacity or extent of the movements (including reflex, if any), in their duration, in their rhythm or order of succession, in their frequency or rapidity, in their intensity; the alterations in the sounds presented by auscultation, if any, stating the cause, intensity, rhythm.

2. The alterations of the chemical and vital phenomena, comprising the description of the alterations taking place in the contents of the organs; alterations of character, of losses, by gains; the alterations in the presence or action of the peculiar agent which is usually present in the organ (such as pepsin).

3. The alterations of the secretions of the organ, which should be described after a separate guide explained below.

4. The alterations in the composition of the blood in the afferent vessels; also of the efferent vessels; these must be described after a separate method, as explained below.

5. Alterations of the nerve actions and of the nerve centers which preside over the functions.

METHODIC DESCRIPTION OF THE PATHOLOGIC ALTERATIONS OF A NORMAL FLUID.

These present to state: 1. The alterations of the physical characters, *i.e.*, quantity, color, smell, taste, consistency and specific gravity. For each state frequency and importance. 2. The alterations of the chemical characters and of the composition, *i.e.*, of the reaction, of the qualitative analysis, of the inorganics (water, gas, salts), of the organics (albuminoids, carbonaceous, of the characteristic or peculiar substances usually present in the secretion,

such as ptyalin, pepsin), of the quatitative analysis of each component part. 3. The alterations of the anatomic elements or solid components, *i.e.*, shown by the microscope, such as salivary corpuscles, blood corpuscles, etc. We must state the quantity or number, dimensions, color, shape, structure, chemical composition (histo-chemistry), their development and organic changes. 4. The alterations in the physiologic functions of those fluids or secretions. 5. The alterations in the origin or development of the secretions. 6. The alterations of the nerve action or nerve centers.

METHODIC DESCRIPTION OF A NEW OR PATHOLOGIC FLUID.

This includes the following: 1. The physical characters; quantity, color, smell, taste, consistency or specific gravity, temperature. 2. The chemical characters or composition, including the reaction, the qualitative analysis, inorganics (water, gas, salts); organics (albuminoids, carbonaceous, characteristic organic substance, if any); quantitative analysis. 3. The anatomic or microscopic analysis or characteristics of the solid elements; quantity or number, dimensions, color, shape, structure, chemical composition, physiologic functions, development or origin of the solid elements. 4. The pathologic functions or uses of the pathologic fluid. 5. The development, origin, changes, etc., of that fluid. 6. Action of the nerves and nerve centers on the secretion of the fluid.

METHODIC DESCRIPTION OF A CONGENITAL MALFORMATION OR DEFORMITY.

This must state if it consists in the absence of the organ, partial or total, or if the organ is double; if it is an arrest of development, such as fissures, fistulæ; if it is atrophy or hypertrophy, and state if it is general or bilateral; if it involves the whole region or organ or if it is partial, *i.e.*, involving a part only, or one side, unilateral; if it is homogeneous or heterogeneous, *i.e.*, of the same nature or character or not, all over; if its anatomic site is in the skin (pigment, hair, cuticle, cutis, sebaceous glands, sweat glands, vessels, nerves), or in the connective tissue, adipose tissue, tendons, muscles, fascia, periosteum, bones, medulla, arteries, veins, capillaries, lymphatic vessels, lymphatic glands, nerves, or an organ special to the region.

If the malformation is a deviation or asymmetry, we must state if it is directed upward, downward, laterally, backward or in an intermediate direction:

METHODIC DESCRIPTION OF AN ACQUIRED OR POST-NATAL MALFORMATION.

The same course must be followed as for a congenital malformation. We must further state if it is characterized by the destruction of the organ, partial and total, also the cause in each; softening, induration, neurosis, injury, inflammation, gangrene, ulcer, fistula, tumor, operation, cicatrix; and whether they affect the skin, connective tissue, etc.

METHODIC DESCRIPTION OF THE LOCAL SYMPTOMS OF A SURGICAL NEUROSIS.

(Sensory neuroses; pain, neuralgia; motor neuroses, paralysis, spasms or convulsions, contractions, retractions, contractures.)

Here the subjective symptoms often occupy a considerable place.

The subjective symptoms present to state the following: 1. The frequency of the attack, daily, weekly. 2 Whether the neurosis is spontaneous, or provoked or increased by the function of the part. 3. The seat or tract of the neurosis, *i.e.*, the spot where it begins, the line or tract which it follows as traced by the patient; the spot where it ends; state if there are spontaneous painful spots or a spot or place where the symptom is greater; also the breadth or width of the tract or course of the neurosis. 4. The intensity, degree or force; slight, moderate, great, very great. 5. The character of the pain, if any; lancinating, boring, acute, dull, sharp, burning, etc.; note the comparisons made by the patient. 6. The course or rhythm of the neurosis, *i.e.*, if the intensity is always the same; if not, describe how it is, then state the time of onset, of maximum, of decrease and of cessation; the influence of morning, noon, evening, night, midnight, dawn; state if there are remissions or intermissions during the attack, or if the neurosis is continuous until the attack is over; state the duration of the remissions or of the intermission; state if attacks are periodic. 7. State the effects of pressure by the tip of the finger or a broad surface; of light pressure or of great pressure; of short or of continued pressure. 8. State the effects of hot or cold applications; of cold weather with or without dampness; the effects of barometric changes. 9. State the mode of termination of the attack; abruptly, rapidly, gradually; if there are any critical symptoms. 10. State the duration of an attack; hours, days, etc.

The physical symptoms are the following: Eruptions or not along the course of the affected nerve or parts. Pressure on peculiar spots, at points of emergence of nerves through fascia and bones. Effects of pricking with a pin, of hot and cold applications, of electricity, with the patient's eyes closed; effects of threats to use painful methods of treatment (blisters, hot iron, etc.). Effects of fictitious medication; bread pills, hypodermics of water, of air.

The functional symptoms present to describe the alterations of the normal phenomena, of the functions of the part (as above), and the alterations by new phenomena; new position of the part, of the patient.

The regional symptoms comprise specially the irradiation of the manifestations; the sensations of heat and cold, of heaviness, of prickings of the region, of spasmodic clonic contractions, of tonic contractions or contractures.

Describe the condition of the patient immediately after an attack, the local and the general symptoms.

Describe also the condition of the patient during the intervals of an attack, the local and the general symptoms.

METHODIC DESCRIPTION OF THE LOCAL SYMPTOMS OF AN INDURATION, A SWELLING, A TUMOR.

The following methodic description is applicable alike to an induration, a swelling, a tumor. It comprises the description of the subjective, the physical and the regional symptoms.

1. The description of the subjective symptoms, *i.e.*, symptoms felt by the patient only, must be made according to the general description; they usually consist of pain, of peculiar sensations, of heat, of cold, heaviness, prickings, etc.

2. The physical symptoms, comprising the number of the lesions, situation (region, superficial, deep), dimensions (relative, absolute), direction, shape. The description of the superficial surface includes the extent or dimensions, shape or form (plane, convex, concave, in a vertical or transverse direction); color

(red, blue, etc.); projections (vesicles, lobules, lobes); depressions (grooves, sulci, ulcers, fistulæ); relations with the skin (loose or adherent); consistency (fluctuant, hard, soft, pulsatile without expansion, pulsatile with expansion); effects of pressure on tumor, artery and vein above and below, edema or pitting; effects of percussion. The description of the borders includes the extent or limits (circumscribed, diffused); shape or form (plane, convex, concave, regular, irregular, etc.); color, projections, depressions, relations with skin, consistency, etc. (like for the superficial surfaces). The description of the deep surface includes the mobility on the deep soft parts, also on the bones; the extent of the mobility; sessile or pediculated. The auscultation of the part should be described as above. The secretions, if any, from the ulcerations, also as above.

The functional symptoms must be described also as above explained.

The regional symptoms or symptoms presented by the neighboring organs must be described as explained above also.

METHODIC DESCRIPTION OF THE LOCAL SYMPTOMS OF A SOFTENING, A BURN, A FROST-BITE, A CONTUSION, A SPRAIN, A CONGESTION, AN INFLAMMATION, A GANGRENE.

The subjective symptoms must be described as explained in the general guide.

The physical symptoms comprise the description of the following points: The number of lesions, the situation, the dimensions or extent, the direction, the shape. The surface presents to study the color, projections, depressions; the relations with the skin (loose or adherent); the consistency, hard, fluctuant, soft, pitting under pressure of the finger, crepitant, pulsatile without expansion, pulsatile with expansion, effects of pressure on the parts, of pressure above, below and around on the skin, connective tissue, adipose tissue, tendons, muscles, fascia, arteries, veins, capillaries, lymphatic vessels, lymphatic glands, nerves, an organ special to the region; effects of percussion. The borders present for study the dimensions or extent, direction (straight or sinuous), shape (circumscribed or diffused), color, projections, depressions, relations with the skin (loose or adherent), consistency, fluctuant, soft, pitting under fingers, hard, crepitant, pulsation without expansion, pulsation with expansion, effects of pressure above, below, all around, on skin, connective tissue, adipose tissue, tendons, muscles, fasciæ, arteries, veins, capillaries, lymphatic vessels, lymphatic glands, nerves, an organ special to the region; effects of percussion. The deep surface of the affected parts presents to study their mobility on the deep soft parts and on the bones; the extent of the mobility. Auscultation presents to study the points explained above. The secretions of the affected parts must be studied as described above also.

The functional spmptoms should be described according to the guide above explained.

The regional symptoms also.

METHODIC DESCRIPTION OF THE LOCAL SYMPTOMS OF A PUNCTURED WOUND, A STING, A FISTULA.

The subjective symptoms call for no special guide here.

The physical symptoms present for study the following points: The number of lesions; each should be described separately. The external or superficial orifice presents for mention its situation, size, shape, direction, color, invertion or evertion, its smooth or ragged appearance; its projecting, depressed or sunken contour, if it is hidden or not by a fold; its consistency (hard or soft); if it is circumscribed or diffused; its mobility (loss of parallelism); if it is clogged or free, and dry or oozing (blood, serum, pus, special substances). The tract or course of the wound or fistula presents for consideration its direction toward the deep parts, upward, downward, backward or in an intermediate direction; the anatomic point toward which it seems directed; if it is straight, curved or tortuous; the cord-like sensation of the tract. The internal orifice or bottom of the wound presents for study its situation, depth or point of exit; if this orifice is visible or can be felt it should be described as the external orifice; state if it has or not penetrated, *i.e.*, injured any important structure, tendons, muscles, fasciæ, arteries, veins, large lymphatic vessels, lymphatic glands, nerves, an organ special to the region; state the symptoms by which each lesion is recognized. State the presence or absence of any foreign body, part of instrument, bone, etc.

Describe the secretions of the wound, if any, according to the guide as above explained.

The functional symptoms should be described according to the general guide above.

The regional symptoms also.

METHODIC DESCRIPTION OF THE LOCAL SYMPTOMS, IF AN INCISED, A LACERATED, A GUNSHOT, A BITE WOUND.

The subjective symptoms should be described as in the general guide.

The physical symptoms present for description the following points: The number of the lesions. The external solution or orifice presents for statement its situation, size, shape, direction, color; its inversion or eversion; its smooth or ragged appearance; its projecting, depressed or sunken contour; its consistency (hard or soft); if it is bruised or not; its mobility (loss of parallelism); if it is closed by a clot or oozing (blood, serum, pus, special substances). The depth or course toward the deep parts, upward, downward, forward, backward, intermediate direction; state toward what anatomic point it seems directed. The internal orifice or bottom presents to study its situation and depth; state if it has or not penetrated beyond the fascia of the region and has or not injured the important structures, tendons, muscles, fasciæ, arteries, veins, capillaries, lymphatic vessels, lymphatic glands, nerves, organ special to the region, and state the signs by which each lesion is recognized, also its extent; state if there is or not any foreign body (piece of the instrument, clothing, etc.) in the wound. Describe the secretions of the wound, if any, according to the guide above. When there is hemorrhage describe it according to the guide for a normal fluid.

The functional symptoms should be described according to the general plan.

The regional symptoms also.

METHODIC DESCRIPTION OF FOREIGN BODIES IN WOUNDS. ENUMERATION.

They may be broken points, broken blades, bullets, wadding, clothing, dirt, pieces of wood, etc. State the number, size, depth, duration of stay in the wound, changes or alterations they have undergone therein.

METHODIC DESCRIPTION OF THE LOCAL SYMPTOMS OF A DISLOCATION AND OF A FRACTURE.

The subjective symptoms require here no special guide.

The physical symptoms present to study the following points: The number of the lesions, situation, dimensions (extent or swelling), duration. The shape; sometimes there exists a characteristic deformity, or the parts have a peculiar position and shape, or there is a shortening of the limb or part. The surface presents for statement the color; the projections or depressions, which sometimes exist on both sides of the parts, in which case they alternate; the relation with the skin (loose, stretched, tense, adherent); the consistency of the parts (hard masses, movable upon each other or immovable, edema or pitting, fluctuation). The borders or edges of the fracture are circumscribed or diffused. The deep surface presents to state the mobility of the bones at points where they should be continuous, the extent of the mobility and the crepitation, if any, fine, coarse, easily produced or not.

The functional symptoms call here for no special description.

The regional symptoms call for the description of the shortening of the limb or part, the peculiar position of the limb or part, or of the patient himself in relation to the part; also the symptoms presented by the skin, connective and adipose tissues, tendons, muscles, fasciæ, arteries, veins, capillaries, lymphatic vessels, lymphatic glands, nerves, organ special to the region, etc.

METHODIC DESCRIPTION OF THE LOCAL SYMPTOMS OF AN ULCER.

The subjective symptoms call for the mention of the presence or absence of pain (indolent ulcers).

The physical symptoms present the following points to be described: The number of ulcers, situation, dimensions or extent (length, breadth, depth), direction, shape. The surface presents for description the color, the projections, depressions, consistency. The borders call for mention of the color, thickness, direction (perpendicular, slanting), regular, sinuous, dissection of the skin (undermined). The secretions, blood, serosity, pus, ichor, should be described as a fluid, as indicated above.

The functional symptoms should be described as indicated in the general guide. The regional symptoms also.

The tabulation of those methodic descriptions will greatly assist in understanding them thoroughly and remembering them more easily.

METHODIC DESCRIPTION OF THE SURGICAL DISEASES AND INJURIES OF A REGION.

When the region of the body, such as the neck, for instance, presents several smaller regions, we must first describe the diseases of that region as a whole and then the diseases of each smaller region.

It must be assumed that the student of regional surgery is conversant with the general surgical diseases, and to avoid useless and often confusing repetitions we must, in regional surgery, confine the descriptions to the following points:

1. Describe the peculiarities only presented by the diseases which may affect any region of the body when they affect that region, in whole or in part. By peculiarity is meant a feature or a point not common to all the regions of the body or of all the regions of that part. All the points or features common to all regions properly belong to the description of the disease in general, and should be carefully omitted under penalty of useless repetition. The peculiarities of the diseases of a region are due to, or depend upon, frequency, causes, pathologic anatomy or physiology, symptoms, course, duration, termination, diagnosis, prognosis, treatment, relapses, sequelæ, forms or varieties and complications; it may be complicated by other diseases, or it may be complicating other less grave diseases. The peculiarities must be carefully described in that order, so that upon reading of the peculiarities due to the symptoms, for instance, the student may rest assured that there are no peculiarities relating to frequency, causes, etc.

2. Describe the diseases special to the region, if any, *i.e.*, not met with anywhere else or rarely so, or enumerate the diseases which are most frequent in the region, or which begin by the region to spread from there over the other regions.

3. Describe the surgical operations of the regions. If these are the same as met with in other locations, the peculiarities or modifications alone which the region calls for must be mentioned. If the operation is one special to the region it must be described with particular care and thoroughness.

4. Each region presents to study the same diseases as described above, *i.e.*, malformations, neuroses, softenings, indurations, etc. Those diseases affect the skin, connective tissue, adipose tissue, tendons, muscles, periosteum, fasciæ, bones, arteries, veins, capillaries, lymphatic vessels, lymphatic glands, nerves, organ special to the region. The diseases of a region must be described after the methods or guides elaborated above.

THE METHODIC REPORT OF A SURGICAL CASE.

The methodic report of a surgical case comprises the description of the history of the patient, of the present state, of the diagnosis, of the course and treatment, of the termination and sequelæ, and lastly, in case of death, of the postmortem examination.

HISTORY OF THE PATIENT.

1. Note the sex and the age of the patient.
2. Note the race, the nationality.
3. Note the family history, *i.e.*, the age and the condition of health of the parents, if living; when any parent is in bad health, ascertain the name and nature of the disease and its course and duration, if possible; if dead, the age at which death occurred and the cause of death. This applies to the ancestors (father, mother, grandfather, grandmother, both on the paternal and the maternal side), to the collaterals (uncles, aunts, cousins), to the descendants (children, grandchildren); note the parent the patient resembles the most or takes after physically.
4. Note the place of birth, also the various places where the patient has lived; the duration of his stay in each place.
5. Note the effects, if any, of the various causes described above in the methodic description of a surgical disease, *i.e.*, of the geographic, telluric, zymotic, physical, chemical, hygienic, therapeutic, anatomic, physiologic, pathologic (including the disease through which the patient has gone); note the cause to which the patient attributes his disease.
6. Note the condition of health previous to the attack, also the date and mode of debut, the premonitory and prodromic symptoms (subjective, physical, functional, regional and general); note the order of succession of the symptoms, the duration of this period, the treatment undergone and the effect, the course of the disease up to the present record.

PRESENT STATE.

The description of the present state includes actually the mention of all the symptoms presented by the patient, the subjective, physical, functional, regional, general; the guides detailed in the methodic description of a surgical disease should be here followed closely. Note the intensity of each symptom.

DIAGNOSIS.

The diagnosis is now made in the following manner:

1. Make a résumé of the salient points or signs of the case derived from all sources, sex, age, race, nationality, place of birth, places where he has lived, effects of the various possible causes of the disease, course, actual symptoms and duration of the disease.

2. Note the diseases resembling the case.

3. Differentiate them as explained in the methodic description of a surgical disease and also further.

4. Diagnose the stage, the tendency to termination.

5. Diagnose the forms or varieties, the complications.

COURSE AND TREATMENT.

The course and treatment call for the recording of the date, day, hour when any changes of any consequence take place in the symptoms (subjective, physical, functional, regional, general), or in the treatment (hygienic, medical, surgical, etc.), as set forth in the methodic description of a surgical disease. Note relapses (date, causes, symptoms, etc.); also recurrences.

TERMINATION OF THE DISEASE.

The termination of the disease should be well noted; the sequelæ or consequences, if any, should be carefully mentioned.

POSTMORTEM EXAMINATION.

The postmortem examination should be conducted after the rules laid down in the methodic description of a surgical disease; that is, the lesions of the main organ should be described first, then those of the region, then those of the distant or general organs; the macroscopic and microscopic lesions should be noted, etc.

FINAL RECORD.

The final record must be complete; it must include all the above, also the various charts (temperature, pulse, respiration, stethoscopic, plessimetric, sphygmographic); microscopic slides, if any, should accompany the record; the pathologic specimens should be deposited in a museum with a distinct number for reference; the label should explain the main features of the case; photographs also.

RULES TO BE OBSERVED BY THE RECORDING SURGEON.

1. Put the questions with politeness and solicitude; kindness and gentleness will accomplish more than any other policy. 2. The phenomena should guide toward the solution sought; do not shape the phenomena toward a desired solution; be led by the answers, do not lead them. 3. The number of questions must not be too numerous nor too few. 4. Use plain, simple words and expressions which the patient will understand. 5. Do not propound complex questions which bear on several points at the same time. 6. Put the questions in such a manner that the answers should be simply yes or no. 7. Do not allow the patient to indulge in too minute details which usually end in useless prattle; however, patients must be allowed a free statement; when they digress too much from the main point, bring them back to it, but gently and with care, otherwise they may become scared or nervous or sullen; some resent it by willfully giving false answers. 8. When the surgeon doubts the veracity of the patient or when the answers lead to an extraordinary fact, the surgeon should change the terms and forms of the questions; he should cross-examine; he should return to this same point later again in the examination; sometimes it is better to return to it the next day or some other day; should the patient then give different answers on the same point, he should be reminded gently of his former answers; the version he finally adopts is usually the true one, or the fraud, if any, is more easily detected. 9. Put as few questions as possible in cases where quiet and silence is necessary, great pain, shock, etc. 10. Proceed with gentleness in the physical examination, especially of the organs of generation and of the anus, particularly in the female. 11. Do not expose the patient any more than absolutely necessary, on account of modesty and also because exposure may cause cold. 12. Questions relative to syphilis must be put with care; never in the presence of the wife or conversely, or of other parties objectionable to the patient. Avoid questions, words, movements or facial expressions which might convey an unfavorable impression to the patient. Take in consideration the social position and the character of the patients in examining them, as some are more nervous and sensitive than others.

METHODS OF INTERROGATION.

There are two methods for interrogating a patient.

The first method consists in beginning to review all the possible features of the case, following closely the order above described. This procedure is long and tedious, because the local trouble is only discovered when the turn of the organ comes in the examination, but in obscure cases it is the safest and most preferable.

The second method consists in well determining the debut and let the patient narrate what he feels and knows, so that he will himself guide the surgeon to the affected organ, which will then be thoroughly examined, and afterward the organs at large.

METHODS OF DIAGNOSIS.

The method by hypothesis consists in taking up at once the first disease which the symptoms suggest to the mind and to see if all the important signs fit it or not; if they do not correspond, then the next disease which suggests itself is considered, and so on until a disease is found that corresponds to all or most all the important signs.

The method by exclusion consists in precising the salient signs of the history; in noting the diseases to which those signs may belong, thus eliminating at once all diseases where those signs are not usually observed; in determining the diseases to which the signs do not correspond thoroughly and eliminating them one after the other according as the signs correspond less and less, so that in the end the only disease retained is the one to which the signs correspond best.

Remarks: 1. In cases where the data are insufficient, all the regions and organs of the body must be examined one after the other before the diagnosis can be reached, as in cases of general injury with no special localization, or where the patient is incapable of precising in any way or gives contradicting or vague, worthless answers, with a view either to deceive the surgeon, or because of a lack of intelligence, or

because of the absence of any predominating sensations, or when there is unconsciousness, delirium, intoxication, coma. The diagnosis is reached only by the general result of such signs as have been gathered in this way. 2. The diagnosis of a disease may be difficult or impossible at the outset or during all its course down to the termination, favorable or unfavorable, or when the surgeon is called at the time of impending death, or when the patient simulates a disease or dissimulates the disease with which he is affected. 3. In cases of disease presenting attacks or exacerbations, it is important to see the patient at the time of the paroxysm.

A SUGGESTION AS TO TREATMENT OF GUNSHOT WOUNDS OF THE LUNGS.

BY G. H. STOVER, M.D.
EATON, COLO.

When a case of gunshot wound of the lung is received into a hospital, the surgical treatment of the wounds of entrance and exit is now-a-days most careful. The wounds are asepticized, a sterile gauze or an air-tight dressing is applied, and as a rule they heal nicely if the patient survives the shock and hemorrhage of the injury.

The point to be made in this communication is that a case of gunshot or other penetrating wound of the lung should never be placed in a general surgical ward, even should the general condition be excellent and the patient not need a special nurse.

Numerous investigations of the bacteriology of the air in surgical wards have uniformly and conclusively shown that the air is strongly contaminated by bacteria; these investigations are so well known and their results so generally accepted that it is unnecessary to refer to the literature.

Now, in a penetrating wound of the chest involving the lung, we have our one or more external wounds which we can protect, by dressings, from contamination. But there are also the wounded air vesicles and bronchi; respiration is continually bringing the bacteria-laden air of the ward into contact with this wounded and only partially protected lung tissue; infection is pretty liable to take place; its development may be slow, it may not produce noticeable symptoms for a long time, the patient may recover from the immediate effects of the injury and leave the hospital apparently in health, only to succumb, after weeks or months, to pulmonary inflammation.

These patients should be placed in separate rooms, with as little atmospheric connection with other wards as it is possible to obtain, and careful measures taken to keep the air of the room clean. If such isolation, etc., be impossible, a respirator, which may be a very simple one, should be constantly worn. In either case the nose, mouth and pharynx should be frequently cleansed with antiseptic sprays or washes.

I do not know if many hospitals place this class of cases in general wards, but I have known it to be done, and in one case that I now recall the patient, previously a robust healthy man, died some months after leaving the hospital, of pulmonary suppuration, and I often thought this might have been avoided had he been isolated and treated as above.

Let us have a Department of Public Health!

SELECTIONS.

Rush Medical College—Annual Dinner.—Remarks of Prof. John B. Hamilton:

Mr. President, Fellow Alumni, and invited Guests:—We celebrate to-night the Fifty-second Annual Commencement of Rush Medical College. We see around us many of our classmates of twenty-seven years ago, many fratres of earlier or later classes. Men are with us as our guests, distinguished above their fellows in education, in oratory and in affairs. They are here to testify their sympathy with Rush Medical College in its aims toward higher medical education, and to rejoice with us in the steps already taken.

I am not commissioned by the Faculty to make any authoritative statements, nor have I had time to examine the college records, so that any remarks I may make to-night are to be regarded entirely as an individual expression. I speak to-night as an alumnus, not as a member of the Faculty.

The history of the progress of Rush Medical College, from its foundation in 1836 to the present time, is full of interest and suggestion, and when we consider that the ultimate test of education is its value to mankind, it must be admitted that Rush Medical College stands that crucial test well. There is, and has been from time to time, a criticism of our own and other schools, as to the insufficiency of the medical teaching. These critics rarely stop to think that the character of the education of the Rush student has heretofore been based scarcely less on his environment than upon his own necessities. When a statue is made, the niche which it is to fill, frequently governs its size, and when the young graduate had to settle among tillers of the soil and villagers without special education, what need was there for a high preliminary entrance test, that would require him to *waste* years in the acquirement of a knowledge of the superstitions of the ancient Greeks? When there was little education of the people generally, why should the doctor so far outstrip them?

When Daniel Brainard and James Blaney taught surgery and chemistry in the old Dearborn Street school, they were furnishing the essentials, but year by year the terms have lengthened; the amount of instruction given, has increased. With the increase of days and hours of instruction in the Medical College, the necessity for higher preliminary education has become apparent. The development of some of the specialties, such as chemistry, physiology and ophthalmology, require for their proper understanding, a fair knowledge of physics and mathematics. To properly understand anatomy and embryology as now taught, some preliminary knowledge of the Greek and Latin tongue is absolutely necessary, because scientists throughout the world have to a limited extent agreed to a common nomenclature.

These new requirements, these changes, have come with equal pace with the developments of the high school, the academy, the college and the university. The young doctor when he leaves the medical school was and is still equal to his best neighbors in general education, plus a medical education. When he goes too far into medical realms he lives in another world, quite too remote to keep in touch with his neighbors. This is the key with which to explain the failure of the young professional man, who deeply desirous of more knowledge, and more culture, goes abroad, remains a few years, returns, lives in a different mental atmosphere from his neighbors, is misunderstood, unappreciated, naturally becomes misanthropic and fails.

Although it is evident that those responsible for the curriculum of Rush Medical College have kept steadily to the line of utility in medical teaching, and borne in mind the nature of the environment of the graduates from year to year, yet for the last few years it has become apparent that some of the

teachers at least have not agreed that everything should be sacrificed to mere utility, and, as is well known, the emotional side of the man should be developed. We have seen the donning of the cap and gown, the establishment of athletic games, the organization of college secret societies (the Nu Sigma Nu and the Phi Sigma Rho) and the affiliation with the Young Men's Christian Association. But there is a danger line in these extraneous educational aids, beyond which the student becomes a general rather than a special student. Music, painting, sculpture and poetry appeal to and develop the emotional side of man, but as Herbert Spencer said "these efflorescences of civilization, should be wholly subordinate to that knowledge and discipline in which civilization rests, and as they occupy the leisure part of life, so should they occupy the leisure part of education."

It was my good fortune, Mr. President, to be present at the opening of that noble building completed by the Faculty of this college on the corner of Dearborn and Indiana streets in 1867. At that time there was no medical college building equal to it, and the old building which it adjoined was remodled and given up to anatomic and chemic instruction. The mayor of the city, the Hon. J. B. Rice, made a speech at the opening, in which he said on behalf of the trustees and the Faculty: "We erect here a grander temple than was of old erected to Æsculapius or Hygeia, for it shall be devoted and dedicated to the sacred cause of humanity." How well this college has fulfilled its trust! The purposes of that dedication I verily believe, have been kept steadily in sight from that day to this.

The storms and financial difficulties through which this college has successfully passed, give eloquent tribute to the courage and faithfulness of the faculty and trustees. The new building of 1867 was destroyed by the great fire of 1871, in the opening week of the college term. The professors of that day, undismayed by the great calamity, bravely took upon themselves the erection of a temporary building on Eighteenth street, in the grounds of the County Hospital, and there—"under the sidewalk"—they taught without interruption, and during that time planned a new building, the present one, corner of Congress and Wood streets. When this building was finished again the professors became personally liable for the funds necessary to construct it and without a murmur they met the obligations as they fell due. A short time elapsed when it was observed that the school could not control the clinical teaching in the County Hospital, and the arrangements were not in accordance with their views; whereupon they gave away the unused portion of their grounds, without regard to future needs, mortgaged the college building for $45,000 hospital bonds, and the magnificent Presbyterian Hospital is the result of that beginning. In the year 1891, when nearly every Eastern medical college had been aided by the hand of private philanthropy, to erect a laboratory for the study of the new field of bacteriology, no aid was visible here, but the Faculty once more devoted the entire earnings of the school for a period of three years toward the erection of the present beautiful structure on Harrison street, and taught without fee or salary.

When it is remembered that no member of the Faculty has any right to the college property, and also that the sole title to Rush Medical College and its equipment is held in trust by the trustees and their successors in office forever, the benevolent character of these repeated personal sacrifices by the members of the Faculty is apparent.

Here is an institution that without endowment, gift, or outside encouragement beyond the confidence of the people, and the love and respect of its alumni, has advanced step by step, in the face of uncommon difficulties, to a position equal to any American institution of its class, and in some respects equal to any elsewhere.

What nobler tribute can be paid to Brainard, the founder, his coadjutors and their lineal successors, than the history and record of Rush Medical College? I stand here not to eulogize this noble institution, but simply to place on record these facts.

Many of the Eastern medical colleges have had buildings given them, and chairs endowed. Philanthropists and moneyed men have vied with each other in wise liberality toward their medical colleges, but here the hand of Sir and Lady Bountiful has never been opened in the direction of its oldest medical college. The college has flourished, but at the expense of the life labor of its teaching faculty.

But we came here, Mr. President, not to eulogize or condemn, but to sing gently the praises of our Alma Mater, to have our annual reunion, to fraternize and to enjoy this hour, which, unfortunately, only comes once a year; so now with music, song and the eloquent speeches which are to follow, let us be happy. If our local philanthropist, like some of the blooded kine amid pastoral scenes, shall fail to yield milk even to the hand of the experienced milker, let us forget our wants and leave the matter to Posterity—Posterity, the sweet child! We well know who its father is and our faith in its stock leads us to believe that its burdens will be well borne. Let us tonight indulge in pleasant reminiscences and recall that Brainard in his day received the prize at the Paris Academy, that DeLaskie Miller was president of the Section of obstetrics at the International Medical Congress at Washington, that Senn's Latin thesis obtained *Magna Cum Laude* at Munich, and that Lyman, Hyde, Senn and Ingals have written books which are as lamps to the wayfarer. Last but not least, the announcement has just been made that the Rush diploma has had its just recognition at the hands of the Board of Examiners of the Royal Colleges of Physicians and Surgeons of England.

Finally, as we have so much to be thankful for, let us conclude in the language of the Bohemian Club of San Francisco, "May the Lord love us, and not call us too soon."—*Corpuscle*, July.

The Procedure of "Blood-Washing" in Infectious Diseases.—According to the *Medical Press and Circular*, June 10, Dr. Henri Barré has recently made an important communication to the Paris Obstetrical Society on this subject. The process, to which Dr. Barré has given the name of "disintoxication of the blood," is derived from *simultaneous* employment of two therapeutic means already made use of in medicine; the one very ancient, bleeding; the other very modern, the intravenous injection of artificial serum. The aim of this treatment is to combat the phenomena of general intoxication which manifest themselves in the course of or toward the end of many diseases, and which in themselves put in peril the life of the patient. Before this treatment is begun there ought to be brought to bear the ordinary methods at the disposition of the physician: purgatives, diuretics, stimulants, sedatives, etc., and it is not until the insufficiency of these is evident that as a last resort resource is to be had to "disintoxication of the blood." This is most often indicated in the following maladies: Uremia, eclampsia, diphtheria—when antitoxic serum does not suffice—infectious pneumonia, capillary bronchitis, malignant icterus, general acute peritonitis, cerebro-spinal meningitis, typhoid fever, measles, smallpox, scarlet fever, puerperal fever, cerebral complications of rheumatism and gout, poisoning by alkaloids, extensive burns of the skin, etc.; in short, in all cases in which there may be expected danger as much or more from general intoxication as from actual lesions of the organs themselves. In all these diseases there is to be noted a considerable diminution, if not a complete cessation, of the urinary function, and the disintoxiation of the blood has for its immediate purpose: 1, to eliminate artificially a certain quantity of toxins; 2, to help to achieve complete elimination by reëstablishing the secretion of urine. The instruments

necessary consist essentially of two india rubber tubes, terminating at their extremities by a needle of a diameter a little greater than that of a Pravaz syringe. The longer of these tubes (about one and one-half inches) conducts into the veins of the arm the artificial serum from a graduated vessel placed at a position more or less elevated in accordance with the degree of force with which the flow of liquid into the venous system is required. The second tube (1 meter), of which the needle is inserted in a vein of the other arm, has its free end in a graduated vessel, and thus serves to extract blood. The flow of the two liquids by this arrangement can be so regulated that no more serum enters than blood flows out and thus the circulatory system, being always equally full, arterial tension need not be diminished, as it is a consequence of ordinary bleeding. "The quantity of serum introduced and the quantity of diluted blood withdrawn may vary between 500 grams and one liter for an adult in accordance with the degree of intoxication. As will be seen, this method of disintoxication of the blood differs materially from another method which has been styled 'washing the blood,' and which has been for some time applied by preference in cases of surgical infection. The difference consists mainly in the contemporaneity of the injection and bleeding. This prevents any severe interference with the circulatory system, and allows, if death from intoxication seems imminent, the withdrawal of the greatest quantity of blood, consequently disintoxication with the least danger to the patient. The exchange of liquids is made very quickly (in thirty to fifty minutes), so that no sharp reaction ensues; grave symptoms insensibly diminish, gradually disappear and are soon followed by refreshing sleep. On waking, the patient desires to pass water. Sometimes sweating accompanies the reëstablishment of urination as in natural crises. In the three cases (two of uremia, one of infectious pneumonia) in which Dr. Barré has applied his method, cases in which everything had proved useless and in which death appeared imminent, he obtained improvement as rapid as that just described. Not only did the most serious symptoms cease, but at the end of the urinary crisis they did not reappear and the patient progressed steadily toward cure. Dr. Barré expounds the following theory to explain the phenomena of the cure: 1. There is elimination of the excess of toxins, which constitute the immediate danger; 2, the good effects continue because the bulk of blood is not diminished in volume in the system and does not need reforming at the expense of the fluids of the economy, and the arterial pressure not being diminished no obstacle to diuresis is created; 3, not only are toxins eliminated which appear to have an inhibitory action on the urinary action, but the toxins which remain become diluted and less powerful for evil; 4, as recent researches have proved, the alkalin salts have a favorable action on the bactericide power of the blood, and the method thus provides the economy with a new means of fighting successfully against the microbes. Dr. Barré believes the method will be found of enormous advantage in veterinary as well as human pathology."

Phagocytosis in Malaria.—According to the *Bulletin* of the Johns Hopkins Hospital, April, the above subject has been under discussion before the medical society of the hospital. This discussion was participated in by Drs. Barker, Sydney Thayer and Osler. The first named speaker took for his text the microscopic observations that were had of his fatal cases. Certain of the leucocytes are the main phagocytes, then the endothelial cells of the blood vessels, the cells of Kupffer in the liver, then the splenic cells of the pulp-cords. Their contents vary; there may be red corpuscles, sound or injured, infected or fragmented; also pigments of the blood and of the parasites; also other phagocytes.

There is manifestly a division of labor among the phagocytes, since certain of them tend to take up one set of the above named ingesta, while others contain another sort. In one of his cases, that which is ordinarily regarded as a rare occurrence, there was a marked tendency on the part of mononuclear leucocytes to take on phagocytosis; in all the tissues parasites were found inside the large mononuclear leucocytes. It is just possible that they have taken up these parasites postmortem. Dock and others having pointed out that the malarial parasites cease their development soon after the death of the host. No blood examination was made during life. If this phagocytosis on the part of the mononuclear elements occurred during life they could not have failed being detected in the fresh blood. He also referred briefly to the physiologic question of the relation of phagocytosis in malaria to bile production is of much interest. The phagocytes can be seen passing from the spleen, which seems to be the main cemetery of red blood corpuscles, laden with broken-up capsules and with pigment; then the blood pigment is seen in the endothelial cells of the liver, next in the Kupffer cells, and finally in the liver cells themselves, as though this were a method of transportation of raw material from the spleen to the liver for purposes of bile manufacture.

With reference to the relation of phagocytosis to natural resistance and to spontaneous cure nothing can be decided. The strife is still going on between those who favor the doctrine of the phagocytosis and those who see in the blood serum the main protecting mechanism.

"As regards the form the parasites assume inside the phagocyte, it is easy to make out that a great many of the parasites rupture after inclusion, and one can see the lines of pigment running from the parasite out into the protoplasm of the phagocyte. Golgi thought that the parasites could multiply within the phagocytes, and Bignami still believes that latent infection is to be explained in many cases by the long continued life of the parasite within the phagocyte. Certainly forms of bacterial infection are described which have analogies with this view. Then, finally, as to the inclusion of some phagocytes by other phagocytes. It makes a very interesting picture to see a huge phagocyte containing within it one, two or several of the cells of the body. Sometimes phagocytes are included along with non-phagocytic cells, and sometimes a phagocyte is seen inside of a phagocyte, which in turn is within a third larger phagocyte. Sometimes the huge phagocytes look degenerated; in such a case we can conceive of a young phagocyte going into the large phagocyte after its contents or even to eat up the dying protoplasm. On the other hand, sometimes the included phagocyte looks degenerated, in which case we can think of the large, active phagocyte taking up the small one into its substance—eating up its neighbor. There curious phenomena, which I have perhaps too fancifully spoken of as the cannibalistic and thieving tendencies of phagocytes, are among the many attractive problems connected with the sociology of cells which the future has to solve."

Dr. Osler's remarks touched upon the subject of the rarity of cirrhosis of malarial origin. He said that so far as he could glean, that affection is remarkably rare in this country. "No well-marked instance of it has ever fallen under my observation. I have frequently looked for it at the Philadelphia Hospital, where we had a very large malarial material, and I think, with the exception of the one case mentioned by Dr. Welch, I do not know of any instance in the North in which the condition has been found. We have had only one case here in which clinically we suspected that the cirrhosis might be malarial.

"With reference to the irritation of the malarial pigment as a cause of fibrosis, it is interesting to call to mind the observation which Dr. Welch brought before us here a few years ago, namely, a form of anthracotic cirrhosis in which the fibrosis in the liver seemed to be due to the amount of pulmonary carbon which had reached the liver in roundabout ways."

A foot-note further refers to the contention of clinicians as

to this alleged malarial sequela, and says that the dispute has been of the warmest. Dr. Osler in his writings has insisted upon "the necessity of considering other etiologic factors, *e.g.*, alcohol, syphilis, tuberculosis, even when malaria appears to stand in a direct relation to the disease. Of the many persons who have had malaria, very few of them have developed cirrhosis of the liver afterward. Dr. Welch states that in his autopsies in New York he met with only one case of cirrhosis of the liver that could be said to be due to malaria; that occurred in an Algerian. Bignami, the most important writer on the changes in the tissues in malaria, thinks that malaria may undoubtedly lead to subsequent cirrhotic processes, and he traces with great acumen the changes that gradually occur as a result of repeated attacks of malaria."

Dr. Thayer asserted that there is as yet no absolute proof that the "malarial parasite produces a toxin, and yet there are observations which are rather suggestive, particularly those by Brousse and by Roque and Lemoine, who have shown an increased toxicity of the urine just following the attack; and by Queirolo, who has shown that the sweat during the sweating stage is much more toxic than that obtained under other circumstances. It must be said, however, that Botazzi and Pensuti have shown that much, if not all of this increased urinary toxicity may be accounted for by the increased excretion of certain potassium salts and urobilin, as well as by the presence of peptone. Taking into consideration, however, the various symptoms of malarial fever, there is, by analogy to the other similar conditions, every reason to believe in the existence of some soluble toxic substance. The fact that in certain severe cases they were present in such small numbers in the peripheral circulation led Baccelli to think that in some instances a small number of parasites might produce the gravest symptoms owing to their excessive virulence. In their recent admirable article Bastianelli and Bignami rather dispute this and say that in no case of pernicious fever in which they have studied the tissues postmortem have they failed to find a total very large number of parasites; very few perhaps in the peripheral circulation, but numerous in the spleen, brain, liver, or gastro-intestinal tract."

PRACTICAL NOTES.

Non-excretion of Pathogenic Microbes with the Perspiration.—Krikliwy describes in *Wratsch*, Nos. 8 to 10, his experience with cats inoculated with anthrax bacilli and then injected with pilocarpin. Microscopic examination of the profuse sweat induced was entirely negative in any discovery of the bacilli, although they were found in the blood and tissues.

Cocain Intoxication.—Several cases of poisoning from cocain are collected in the *Therap. Woch.* of June 21, most of them produced by injections in the urinary organs. In one case a syringe of 20 per cent. solution was injected into the bladder, followed by immediate death. The dose in the other less serious cases was 2 grams cocain to 30 grams water. In another case 0.5 grams injected in two doses was followed by transient edema of the eyelids.

Boards of Health and Cemeteries.—A law was passed in New Jersey, which was approved March 5, 1896, that provides that no new cemetery shall hereafter be established, nor shall any cemetery now existing be enlarged or any lands not now used for cemetery purposes be used for such purposes in cities of the first class, in that State, without the consent of the common council and board of health of such city, to be expressed by resolution and the approval thereof by the mayor of such city.

Effect of Local Warmth on the Secretions of the Stomach.—Some experiments by Prof. Tschudnowsky on normal persons with hot compresses or a Japanese heater, applied to the region of the stomach from three-quarters to three hours, showed that the general secretions and activity of the stomach were increased, with more free hydrochloric acid, and an increased power of assimilation and motor activity of the organ. These effects persisted from several hours to several days.—*Medicina*, Nos. 3 and 4.

Cresochin.—Under this name a non-alkalin cresol disinfectant is prepared which is stated to be a neutral combination of tricresyl sulphonate and quinolin with tricresol. It contains 33 per cent. of quinolin and 17 per cent. of tricresyl. It is not caustic and is soluble to the extent of 1 to 25 in water. It is specially indicated as a disinfectant, since, being free from alkali, it does not set free ammonia from nitrogenous organic matter. *Druggists' Circ. and Chem. Gazette*, July, 1896.

A New Appliance in Intestinal Surgery.—Dr. M. L. Jamison, in the *Medical Sentinel*, June, 1896, calls the attention of his Pacific coast brethren to the fact that they can secure apposition of the divided intestine just as successfully by using a roll of half-cooked biscuit or bread dough. This can be rendered aseptic, and after using the Lembert suture, can be slipped either down the intestine or left in situ. There is not the slightest occasion for any expensive "buttons" of any kind. What is the matter with a bread stick?

Hot Compress for Ulcers.—*Nouveaux Remèdes* for June 24, quotes a Russian periodical in which Yakovlef announces his successful treatment of atonic ulcers with moist hot compresses, during the last three years. They will, according to Yakovlef, cure where all other kinds of treatment have been ineffectual. He ascribes their success to their favoring local hyperemia, thus improving nutrition, while being moist they do not adhere or irritate.

Surgical Instruments and Appliances Out of Place.—The following cases of foreign bodies left in the abdomen after laparotomy are cited in the last number of our Spanish contemporary, *El Siglio Medico:* "Sir Spencer Wells twice forgot forceps in the abdomen; Pilatte, a compress; Terrillon, a forceps; Quenu, a compress; Michaut, a roll of iodoform gauze; Severnao, two binders of 1.30 meters long. The utmost care of instruments should be taken during a laparotomy, for, as Pozzi says, a pair of forceps may slip into a basin or be carried off attached to the tumor or to a sponge without being perceived and lead to the opposite error. H. C. Coe, on two occasions, reopened the belly to search for a sponge that had fallen into a pail."

New Hydrostatic Exploration of the Body.—At the meeting of the Académie de Médecine, June 16, Marc Sée announced a new and effective method of abdominal palpation. When a person reclines in a bath, the front abdominal wall is lifted by the water until it can almost be said to float, while the muscles are so relaxed that the whole abdomen becomes flaccid, rendering palpation an easy matter. Sée states that he has been able to palpate in this way in the water the entire abdominal cavity, even to the spine and the sacro-vertebral angle, through the viscera.—*Bulletin*, June 16.

Pericardotomy.—The superiority of pericardotomy to puncture in the treatment of pericarditis with effusion is confirmed again by its success in a case recorded in the *Arch. de Méd. et de Ph. Milit.*, Nos. 1 and 2. Four punctures into the serous effusion were ineffectual, but complete recovery followed pericardotomy with local cocainization, in the fourth left intercostal space, although broncho-pneumonia of the left side intervened.—*Centralbl. f. Chirurgie*, June 13.

Tolerance of the Pregnant Uterus.—Ozenne has a study of the effects of traumatism on the pregnant uterus in the *Bulletin Médicale* for June 21, which confirms its surprising tolerance to injuries. Accidental or surgical traumatism in the neighborhood of the uterus often has no influence on the evolution of the pregnancy. It is more liable to affect it if in the genital zone, but in all cases it is by no means unusual to have the pregnancy continue to a natural close, and the surgeon is justified in any operation on or near the pregnant uterus, not only when it is urgent, but also when it is for the purpose of

removing any cause liable in the future to interfere with the normal evolution of the pregnancy. In two cases in which he had removed a large polypus from the neck of the uterus, the pregnancy continued uninterrupted.

Treatment of Diabetes Mellitus with Rectal Injections of Pancreatic Glands.—Lissère has treated two cases of diabetes mellitus with fresh pancreatic glands chopped fine and left twenty-four hours in a saline solution. As the stomach refused to tolerate this, he administered it in rectal injections once or twice a day. The results were that the polyuria was very much diminished, as also the amount of sugar in the urine. Both the sugar and the diuresis returned to their original conditions whenever the injections were suspended. They also exerted a favorable effect upon the general health; the patients gained in weight and lost their excessive thirst.—*Nouveaux Remèdes*, June 24, from *Med. Obozr.*, No. 4.

Neuritis from Compression of the Ulnar Nerve by the Bicycle.—*La Province Méd.* of June 20 describes the experience of Dr. Destot after a long ride on the bicycle when he was obliged to grasp the handle with especial firmness for some reason. It produced pronounced neuritis of the ulnar nerve with paresis. It adds that it is very important to have the handle of the bicycle constructed on physiologic principles. The body is supported and balanced by the inner edge of the hand, and if the part of the handle grasped is perpendicular to the axis of the hand, the contracted flexor muscles of the fingers form a series of elastic cords which act like a cushion to prevent injury to the nerves from compression and the incessant jar of the machine. But if the handle is oblique to the axis of the hand the lower end presses against the root of the thumb and also compresses the pisiform, the flexor muscles no longer act in the same way and serious injury to the ulnar nerve may result.

Helferich on the Indications for an Operation in Appendicitis.—It is universally conceded now that the only treatment of a well-developed perityphlitic abscess is the prompt use of the knife. It is indicated by swelling in the iliac fossa, and diminished percussion, except when there is a layer of intestine above or gas in the abscess. Cutaneous inflammation is rare, while edema of the cellular tissue during the inflammation is frequent. McBurney's sign is of more importance in diagnosing chronic appendicitis than in an abscess. Roux considered a certain infiltration of the cecum as important. Lennander has not always observed Madelung's sign of the difference between the rectal and axillary temperature. Helferich advises scrupulous care in exploring, not to split the wall of the abscess. He recommends exploratory puncture only when the operation can follow immediately. It is important to examine also the rectum and vagina, as the abscess may present itself in the small pelvis and even in parts still more remote. It may even penetrate into the pleura, or any of the hollow organs of the body, when it is usually fatal. He advises prompt operation in recurring appendicitis, as it may turn into perforating peritonitis at any moment.—*Centralb. f. Chirurgie*, June 20.

Surgical Treatment of Acute Diffuse Peritonitis.—John Y. Brown says that prominent among the factors leading up to success in the management of intra-abdominal inflammation has been the acceptance of the doctrine that peritonitis, whether local or general, is from its inception a condition demanding the care of the surgeon. He draws the following conclusions: 1. That septic peritonitis is a surgical condition, and should at the earliest possible moment be put under surgical supervision. 2. That all cases of acute diffuse peritonitis are not necessarily fatal, and while the mortality following operation must be great, many of these cases can be cured by prompt resort to the knife. 3. That success in these cases will depend on (*a*) early operation, (*b*) careful cleansing of the abdominal cavity by sponging and irrigation, (*c*) by drainage by means of glass drain, supplemented if necessary by gauze. 4. That all such cases should be operated on. No surgeon should fail to give his patient the benefit of the chance afforded by operation, no matter how desperate the condition may be; they all die without operation, and many desperate cases are cured by prompt surgical interference.—*Medical Mirror*, May, 1896.

Formalin in Ophthalmic Practice.—Dr. Swan M. Burnett mentions the property formalin has of diffusing itself through living as well as dead tissues, a property not possessed in the same degree by any other drug. Sublimate coagulates albumin and limits its own field of action. Formalin should be more useful than other germicides for the class of infections in which the microbes penetrate the substance of the tissues. Excellent results have been obtained from its use in infecting ulcers of the cornea and purulent conjunctivitis. The corneal ulcer can be touched with a solution of 1 to 200 or 1 to 500, once every day, and for general use as an antiseptic a collyrium of 1 to 1,000 or 1 to 2,000. Satisfactory results have been obtained with it in muco-purulent and purulent conjunctivitis. In the more severe forms silver nitrate is used in addition. In acute catarrh of the conjunctiva (pink eye) it has acted most promptly when used as a collyrium of the strength of 1 to 1,000 or 1 to 2,000 applied every four hours.—*Nat. Med. Review*, July, 1896.

Treatment of Gastric Crises in Tabes with Cerium Oxalicum.—The serious vomiting periodical in tabes is sometimes relieved by morphin, but its continuous use in chronic cases is not advisable, and some, like Hoffmann, have not been successful with it. Professor Bechterew, of St. Petersburg, has been using cerium oxalate for this purpose, and reports marked success with it. The vomiting seizures during the day were reduced from 200 to six in two days. The act of vomiting was rendered much easier, while the pain, thirst and nausea vanished to a great extent. The psychic conditions were also much improved, restlessness subsided and sleep returned. Urinating became slightly more difficult, but not enough to require a catheter. The most important improvement, however, was that the food could be retained, the vomiting after eating having been so much reduced. The *Therapeut. Wochensch.* of June 21 describes a couple of severe typical cases relieved by this treatment. The dose was the same as in hyperemesis gravidarum, from 0.5 to 0.10 or even 0.15 three to four times a day.

Chaput on the Treatment of Cancers of the Rectum.—In ten resections of the rectum for cancer, Chaput has had eight recoveries and two deaths (one due to broncho-pneumonia from ether, and the other to laceration of the ureter in an almost inoperable case). Two cases were followed by a speedy relapse, but three others have shown no signs of a relapse in the two to five years since. Another has had a relapse, but it has had no effect on the general health. In two cases there was no prolapsus; in one of them he had made a circular suture, in the other he had twisted the upper end according to Gersuny. In two cases in which he had not taken these precautions, there was prolapsus. He considers cancer of the rectum as one of the least liable to a relapse. Technique: He advises a preliminary anus made in the transverse colon a couple of days beforehand. Y-incision; resect the coccyx and respect the sacrum; make as nearly a circular suture of the two ends as possible; if impossible, twist the upper end à la Gersuny; ligatures are unnecessary; the skin is not to be sutured. Pack the wound with aseptic gauze, impregnated with a weak phenic solution. Hochenegg's method (invagination of the upper into the lower end) should be absolutely rejected. Indications: Cancers of the recto-vaginal septum, remove with a perineal incision; close the upper end of the rectum in a cul-de-sac; ensure evacuation of matters with a definite iliac or transverse

anus. Cancers of the lower part; circumscribed; circular incision with Denonvilliers incision and resection of the coccyx (Verneuil, Terrier), suture to the skin of the upper end twisted a là Gersuny. Hartmann's method (ablation by the natural route) is highly to be recommended. Diffuse; combine the perineal and the sacral incisions. Cancers of the middle region; the sacral route is preferable to the vaginal. High cancers must be attacked through the abdomen, while recto-colic cancers are best removed by the abdomino-sacral route. —*Bulletin Médical*, June 21.

The Micrococcus of Articular Rheumatism.—The *Gaz. degli Ospedale e delle Clin.* for June 20 contains a description of the micrococcus discovered by Maragliano and his assistants in the blood of typical cases of acute articular rheumatism. He found two microörganisms, but one, resembling a bacillus, is not pathogenic. The other produced in rabbits the symptoms of the acute form of the disease, polyarthritis, pericarditis, pleurisy with effusion, endocarditis, etc. An injection of ½ to 1 c.c. of bouillon culture resulted in death after sixteen days. Some healthy rabbits placed in the cages formerly occupied by the inoculated rabbits succumbed to an epidemic of arthropathy with exudation. This new micrococcus resembles the staphylococcus, but it is only half the diameter (0.5 μ) of the aureus. It is massed in groups of six to ten, except in bouillon cultures, when it occurs in short chains or united by twos. It stains readily by the Gram method and with all the usual anilin stains. It forms an oval culture on a gelatin plate, finely granulated, with even edges, pale yellowish at the surface and growing more yellowish as it descends. In the gelatin tube culture a thin layer forms on top while the extension below rather dries up the gelatin than liquefies it. The growth is more scanty as it works downward. In old cultures it resembles a flower with notched petals, the stem spreading out above into an enlargement resembling an ovary. In agar and serum it is whitish, and the edges are even, as is also the case on potato. Cloudiness is noticeable in bouillon after the second day, which indicates that it is motile. It does not coagulate milk; it develops at the usual temperatures, but especially at 98 degrees.

The Causes of Retroversion and Retroflexion of the Uterus.—Dr. Hunter Rabb says that (*Cleveland Med. Gazette*, July) in the causation of backward displacements of the uterus the following factors may be concerned:

1. Congenital defects. A short vagina necessitates a forward position of the cervix; this tends to bring the fundus and anterior surface of the uterus under the direct line of abdominal pressure. The ordinary distension of the bladder now throws it backward, thus causing a displacement. A congenitally long cervix can not rest with its long axis crossing that of the vagina, but must accommodate itself to this axis; this also tends to throw the fundus backward. Where the cervix is long the body of the uterus is apt to be small and short. In such case the normal position of the uterus is in retroversion.

2. Extreme distension of the bladder throws the fundus far back in the pelvis behind the median line. When this happens often the malposition is liable to continue.

3. Impacted feces in the rectum extending up above the ampulla push the cervix down in the vagina, and thus change an anteversion into a retroversion.

4. A sudden severe strain put upon the abdominal muscles, especially when the bladder is full, brings about a retroflexion by forcing the uterus down when the pelvic floor yields.

5. Of all causes of retropositions the most frequent is a relaxation of the vaginal outlet; the relaxed outlet must be regarded as a deficiency in the pelvic floor, which leaves a smaller or larger surface over which no counter-resistance to the intra-abdominal pressure remains. Every act accompanied by intra-abdominal pressure tends to thrust out the adjacent vaginal walls; when these have once entered the orifice they continue to be forced down, wedging the posterior wall further away from the symphysis. While the parts below give way the uterus is forced toward the outlet. The fundus rotates so far back that the pressure is finally spent on the anterior surface of the uterus and complete retroversion or retroflexion is established.

6. Finally retroversion and retroflexion may be caused by inflammatory changes in the uterine support, or by dragging of adhesions resulting from pelvic peritonitis.

The Decadence of the Gargle.—An editorial in the *American Therapist*, for June, discusses the question of the future of the gargle, based upon the views recently expressed by Mr. Lennox Browne, at a meeting of the British Laryngological Society. That gentleman, who is the senior surgeon of the London Throat Hospital, stated that his experience pointed distinctly to a conclusion that the time had now fully come when the gargle should be abolished in the treatment of diseases of the throat. He aimed to show that fluids were not brought into effective contact with the posterior surface of the pharynx, if used as gargles in the ordinary way. The editor of the *Medical Press and Circular* is inclined to support this view, with the following argument: He says, "It is to be feared that the time-honored gargle has outlived its usefulness, and that even its antiquity, coeval though it be with the poultice and the leech, can not blind us to the fact that it necessarily falls short of the mark when the diseased tissues are on a plane behind the posterior pillars of the fauces. Even a casual study of the conditions which obtain in the act of gargling as usually understood, will show that the fluid is kept in front of the lowered soft palate, so that it is impossible for any effects to be exercised on tissues posterior to that structure. A gargle, as ordinarily employed, is, therefore, only a mouth wash. Under these circumstances, it is really surprising that it should have been reserved for Mr. Lennox Browne to enter a protest against the continuance of a practice which is not only useless but, in presence of actual inflammation, is exceedingly painful and may be injurious.

"Mr. Browne describes, however, another method of gargling, using the term gargling in the sense of trickling a fluid through the mouth into the pharynx which is free from one, at any rate, of the objections already alluded to, viz., the method of Von Troelstch, for which the directions are as follows: 'Take a tablespoonful of the gargle in the mouth, hold it in the back of the throat with the head thrown back, then, closing the nose with the finger and thumb to prevent entrance of air, open the mouth and make the movements of swallowing without letting the liquid go down the throat.' By this means the medicated fluid can, it is true, be brought into contact with the pharyngeal tissues, but the process is by no means easy to carry out in an effectual manner, and in the majority of instances it is quite out of the question. Gargles, again, are quite inadmissable in cases entailing the dorsal decubitus, such as diphtheria, in which cardiac failure has to be sedulously guarded against. Another obvious objection to gargles is, that they must perforce comprise only the most harmless ingredients, if we are to avoid subjecting the patient to the danger of poisoning in the not improbable event of any portion of the fluid escaping control and finding its way down the esophagus. Moreover, solutions thus employed must not contain any considerable quantity of an active ingredient, because they will come in contact with vastly more healthy than diseased tissue. The moral is, that gargles should give place to more scientific and precise methods of applying topical agents to diseased surfaces, especially in children, to whom gargling of any sort is virtually an impossibility. The future, therefore, is toward irrigations, sprays, lozenges, and, in the case of children, to medicated confections."

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INFORMATION WANTED.
It would greatly facilitate the prompt delivery of the JOURNAL to those members of the ASSOCIATION living in large cities, if they would kindly furnish this office with their street address in those cases where it is omitted from the wrapper of their JOURNAL, as we have been notified by the postmasters of the larger cities that second-class mail matter not having street address, would be placed in the general delivery to await call.

SATURDAY, JULY 18, 1896.

THE EATING OF ICES.

There has been some outcry lately against the eating of ices. Hands have been thrown up in astonishment because certain ice cream has been found to contain certain adulterations, and not infrequently the deadly ptomaine. There is no question that many food products are adulterated, but that ice cream is more frequently adulterated than other articles of diet, we disbelieve. A sneer has become habitual with many when speaking of the Americans; and the American fondness for ice water and iced confections has passed into a proverb.

The truth is, however, that the Americans are simply following classic models. When our European confrères smile at our imbibition of chilled fluids, we can remind them that the old Greeks and Romans were even more addicted to the use of ice water than any of the moderns, if we may judge from the pains taken to preserve the ice. ATHENÆUS, quoting CHARES, declares that when ALEXANDER the Great besieged Petra, a city of India, he filled thirty trenches with ice, which being covered with oak boughs, preserved it a long time. The establishment of large ice houses in Rome is usually accredited to the EMPEROR NERO, although the custom of preserving ice was common among the Romans. SENECA, in writing of this, exclaims, "The Lacedæmonians banished the ointment sellers and commanded them to be gone with the utmost speed out of the country; what would have been done had they seen shops to reposit and preserve ice"? PLUTARCH relates that ice was usually preserved by being wrapped in cloths and straw. The luxurious NERO introduced the use of snow, and wine was cooled by pouring it through a strainer[1] filled with snow (*colum nivarium*). Occasionally the wine was diluted by pouring snow-water into it,[2] but there must have been some unpleasantness attending the use of snow water, for PLINY[3] states that "It was the EMPEROR NERO'S invention to boil water, and then inclose it in glass vessels and cool it in snow, a method which insures all the enjoyment of a cold beverage, without any of the inconveniences resulting from the use of snow. Indeed it is generally admitted that all water is more wholesome when it has been boiled; as also water when it has once been heated will become more intensely cold than before—a most ingenious discovery. The best corrective of unwholesome water is to boil it down to one-half. Cold water, taken internally, arrests hemorrhage. By keeping cold water in his mouth, a person may render himself proof against the intense heat of the bath" (*Bostock's Translation*).

But there has always been a prejudice against the use of cold liquids and cold confections. This prejudice must have been the exclusive property of the minority, for the custom has survived and we go on drinking our ice water and eating our frozen *friandes* as NERO did more than eighteen hundred years ago.

The intermediate attempts to write down the custom having failed, it must be clear that something more than a mere desire for luxurious living has continued its use. The Code of Health of Salernum said nothing against it; on the contrary, as a means of reducing cerebral hyperemia from inebriety, the advice is given:

> "To drink cold water let him not refrain,
> Because it hinders all that hurts the brain."
> —Holland's Translation *Flos Medicinæ*.

BRUEYRINUS insists that GONZAGES, Duke of Mantua, was killed by drinking ice water, and VALANGIN mentions the case of a nobleman, whom he describes as being in every respect a manly character. He was a great advocate for the cold bath, and in general for everything that could harden the body, and imagined that cold "*applied internally* must be as salutary as when applied externally. He often drank his liquors out of ice and ate plentifully of ice creams of various kinds. After having one day taken a greater quantity of these than usual, a fatal inflammation, which at once affected the stomach, the intestines and the kidneys, notwithstanding the assistance of three of the most eminent physicians, who did not leave him an instant, made him fall a victim to his favorite opinion."[4]

Most of the alleged fatalities following the ingestion

[1] Potter, Grecian Antiquities, Vol. 2, p. 258.
[2] Adams' Roman Antiquities, p. 421.
[3] National History, Book 31, C. 24.
[4] Sinclair, Code of Health, Vol. 1, p. 365.

of ice cold drinks except in large quantity rest on no better foundation than the cause in the case cited by VALANGIN, which, viewed in the light of modern pathology is simply absurd.

The profession need not ignore the object lesson that appears under their very eyes every day, namely, that unadulterated ices taken in moderation are beneficial and healthful.

We trust that one of our esteemed contemporaries which recently published a diatribe against the use of adulterated and fictitious ice cream, will not assert that this JOURNAL favors the impure product. Let us throw every safeguard against the sale of impure food and drink of every sort, and then when the sun is hot and cooling shades invite, let us eat our ices and drink our lemonades unmixed by fears of lingering poison in form of microbe or ptomaine.

PHYSICAL TRAINING IN THE ARMY.

It is only of late years that the value of physical training has been recognized in the Army of the United States, although the country as a whole for the past fifty years has participated more or less in the modern revival of physical culture. Some of our schools adopted the German system of gymnastics, others the French system of calisthenics and others again the athletic sports of the English. The first gives muscular development, the second grace and suppleness, the third grit, energy and determination to win. All are needful to the proper development of the soldier. At most of our military posts foot-ball and base-ball are played when the weather is favorable, but such sports do good to but few besides the players, and at many posts where the winters are long it has been reported that the only exercise of the men has been shoveling snow and distributing fuel. What is required at every post is a gymnasium with appliances and graded exercises. At West Point, as at most of our colleges, attention has been given to this subject for a number of years and four years ago a handsome gymnasium was completed and fitted up with every desirable appliance. The fourth class cadets receive instruction three times a week from October to June, each lesson forty minutes. The training is based on the German system with such additions from other systems as seem advisable to develop activity and grace as well as power. Gymnasiums have been extemporized at several of the posts by fitting up an unused barrack-room or hall with the needful appliances, and in some instances when the post provided no facilities company commanders have introduced systematic training into their barracks.

This movement has of late received a hearty impulse by the energy of Major General MILES, commanding the Army. Last year while in command of the Department of the East he issued several circulars calling attention to measures intended to promote the physical development of the soldiers in his department. One gave instructions in methods to be adopted at posts where there were few facilities, submitting a series of exercises for the use of instructors. Another outlined a system for perfecting the training where every facility was at hand, giving due weight to the necessity for medical supervision, not only to prevent overstress but to determine the general line of exercise in particular cases where the development of the individual was unequal. A third gave instructions for training in swimming, in rescuing those in danger of drowning and in restoring those apparently dead, SYLVESTER'S method being that recommended. Since assuming command of the Army the efforts of General MILES have been devoted to extending this work to all the Military Departments. Hence for instance, on June 26 last there were issued from Headquarters, Department of Dakota, General Orders enjoining that all possible facilities and encouragement be extended to officers and enlisted men for indulgence in gymnastic and athletic exercises and all manly pastimes and field sports that tend to develop bodily activity, foster a spirit of emulation and give added interest and attractiveness to the soldier's life. These orders require that a gymnasium be established at each post and an officer designated to superintend the systematic practice of the troops in gymnastic exercises for thirty minutes a day three times a week for nine months of the year (General MILES calls for half an hour every day for nine months) and to initiate and manage all games and contests. Among indoor exercises for inclement weather are mentioned: boxing, fencing, vaulting, swinging clubs punching the bag, jumping either for distance or height with or without pole or spring board, and the use of dumb-bells, parallel and horizontal bars, swinging rings, the trapeze, the ladder, etc. For out-door practice there will be in addition to the above, the passage of ditches, fences, walls, houses and other obstacles; running, wrestling, bicycle riding, throwing the hammer, putting the shot, rowing, swimming, skating, snowshoeing and the like, according to season and facilities. General participation in such games as foot- and base-ball, quoits, tennis, golf, polo, etc., is also to be heartily encouraged.

This interest in physical training in the Army will result in many advantages. It will make life more interesting to the men now in the ranks and will tend to bring into the service a better class of young men than heretofore. It is the present advantage also of keeping the men at home in barracks and away from evil resorts. It is to be expected that the percentage of injuries will be increased but this will certainly be more than offset by a lessening of the number disabled as the result of dissipation. The special objective is however the improved condition of the

troops. These systematic exercises will make our soldiers able to answer the call to special duty at any moment by keeping them always in training; and they will no doubt give an impetus to the physical improvement of many individuals in civil life by attracting attention to the methods adopted by the military authorities, by increasing the care given to this subject at the many universities and colleges having military instructors detailed from the Army, and by stimulating the interest which the members of the National Gaurd have hitherto shown in their military and athletic training.

THE NEURON.

Those of the JOURNAL readers—and we are glad to state they are steadily increasing in number—who studied anatomy and histology some lustrums ago, and supposed that these branches of medical science were at a standstill, are occasionally nettled to find nowadays that in some departments, especially neurology, rapid and even phenomenal advances are being made. In the place of our old acquaintances, the nerve fibers and nerve cells, we are confronted with neurons, axons, dendrites and other unfamiliar appellations. We learn that instead of the nervous system being composed of two kinds of tissues, the vesicular or gray and the fibrous or white, it is made up of a series of independent morphologic and physiologic units which have been named neurons by WALDEYER.

Each neuron is composed of: 1, a nerve cell; 2, protoplasmic processes or dendrites; 3, its axon or axis cylinder passing into the nerve fiber; and 4, its ending in a branched tuft. In the neurons of the anterior roots of the spinal nerves the protoplasmic processes are short and the axis cylinders long; in the posterior roots these conditions are reversed, the axis cylinders are short, the protoplasmic processes, on the contrary, are long, reaching to the periphery from which impulses are collected. These conditions are explained by LENHOSSÉK'S discovery in the earth worm. In this animal there are no nervous organs like the spinal ganglia, but sensory cells or gangioblasts are dispersed through the integument with long processes reaching internally to the central nervous system and short filaments reaching externally. It would seem as if during the evolution of the higher forms, the gangioblasts have been withdrawn from the exterior and thus pulled their collecting filaments into the long process.

We learn also that the transmission of nervous impulses does not require a continuous physical structure without breaks. "Substantial continuity does not exist," says RAMON Y CAJAL,[1] "the currents are transmitted from one cell to another by contiguity or contact, as in the joining of two telegraph wires. This contact takes place between the terminal branches or collaterals of the axis cylinders of one side, the cellular bodies and the protoplasmic branches of the other." Instead of afferent and efferent, or centripetal and centrifugal, to denote the direction of the nervous currents, CAJAL has introduced the terms cellulipetal and cellulifugal. For example, the end tufts of the neuron are stimulated by impressions from the exterior; this impulse is transmitted to the nucleus of the nerve cell (cellulipetal); from there it is conveyed to other terminal tufts, say in muscle fibers (cellulifugal).

According to CAJAL,[2] "the probable direction of the nervous movement is cellulipetal in the protoplasmic prolongations and cellulifugal in the axis cylinders." GOLGI, the distinguished Italian histologist, believed that the Deitersian or protoplasmic processes preside over the nutrition of the nerve cells, collecting nutriment for them. GERLUCH was of the opinion that the terminals were collected into a fine network, interlacing with each other and forming a support for the gray matter. It is now thought beyond question that the protoplasmic processes are for the transmission of nerve impulses and nothing else.

The simpler reflex acts can be produced by impulses from without, being transmitted along a neuron to others in the spinal cord and immediately back to a muscle fiber. It is not likely this ever actually occurs, but that the reflex acts are of a more complex character requiring the interposition of secondary neurons. The practical application of this neuron theory lies in the fact that nerve fibers are now to be looked upon as processes of the nerve cells themselves. We can therefore understand the influence of diseased conditions of the fibers on the nerve cells better than in 1857, or when WALLER announced his law: "Degeneration occurs along the whole extent of any nerve fiber which is cut off from the cell which governs its nutrition." This cell, HIS has shown us, from his embryologic researches, is in every case the cell from which the fiber originally grew, a conclusion we can, from our present knowledge of the neuron, readily understand. It was formerly supposed that the proximal part of a severed nerve, with its cell body, did not undergo degeneration but remained normal. From time to time, in patients who had suffered amputations, examination showed that these cells instead of remaining normal had undergone more or less degeneration. These clinical observations have been supplemented by experiments. NISSL, for instance, has severed the facial nerve in rabbits and found definite alterations in its nucleus in twenty-four hours, consisting of a fine granular degeneration and rarefaction of its ganglion cells. FLATAU has confirmed these experiments by some others on the motor oculi of cats.

We can understand if the nervous system is made

[1] Les Nouv. Idées sur la Struct. du Syst. Nerveux.

[2] Loc. Cit.

up of cellular units, like the liver, kidney, etc., it must be subject to like cellular changes. Future researches will entirely recast the pathology of the nervous system and place it on a firmer basis. This will no doubt require much time and labor, but the field will abundantly repay the workers in it.

PARESIS AND PSEUDO-PARESIS.

Within a few years the literature of paresis or general paralysis of the insane has been enriched by numerous papers, and some different conceptions of the disorder than those that have hitherto prevailed, have been suggested. Not only its pathology and etiology, but also its symptomatology have been questioned, and the consequent confusion has induced at least one author to say that "as it at present stands, general paralysis would appear to be best defined as a progressive disease which begins anyhow but ends somehow." Whether this pessimistic conclusion is justified may be a question, but the fact illustrates the confusion that these later aspects of the question have created.

For a long time it has been the practice to recognize paresis as a marked entity, varying somewhat in its symptoms and rather uncertain in its intimate pathology, but always or generally readily recognizable. With this, however, it has been claimed exist other conditions closely resembling it but nevertheless entirely different, but with almost identical symptomatology that embarrasses the diagnosis and tends to make confusion in certain special cases. Such are the pseudo-pareses due to alcohol and lead and some conditions following fevers, malarial or otherwise, insolations and especially syphilis. This latter has been the cause of pseudo-paresis *par excellence* in the classification of certain authorities, following FOURNIER, the author of the term "syphilitic pseudo-general paralysis," who, however, has himself apparently since abandoned the idea of its being a distinct entity apart from the genuine disease. Still another form, mimicking paresis in some of its earlier phases, at least, is occasionally met with in neurasthenia, and this seems to have been generally overlooked by those who have written on the subject, notably so by DR. HYSLOP, the author already quoted, who has recently discussed these causes of confusion and who rather caustically criticises the common indefiniteness of medical notions in regard to paresis.

There is no question but that there is quite a wide range of variation in the symptoms of this disorder, and that it is impossible to make any absolutely typical syndrome to which all cases must conform. This fact has, however, long been recognized, and some have maintained that we have in this so-called disease several distinct disorders. It is also true that there are several conditions that more or less resemble it but differ in their prognosis, such as the temporary pseudo-paresis of alcoholism, saturnism, malaria and neurasthenia. These can not indicate a permanent or serious lesion of the brain, but there is no doubt that their occurrence means a functional involvement of the same cortical regions as are implicated in true paresis. The one is due to a temporary intoxication, the other to destructive and irreparable lesion, but there is no reason why the toxic agents that usually cause only transient disorder can not, under certain conditions, induce the permanent and progressive lesions of the true disease. In this way we may perhaps account for an occasional case of paresis with no other known causal factor than alcoholic excess, over-worry or work or lead poisoning. There would be no good reason for calling such an actual progressive case pseudo-paresis, even if it were positively known that it had no other origin than one of those above enumerated. The designation should be dependent on the actual condition, not on its cause, but there is no propriety in including transitory functional disorders in a disease which is essentially and typically progressive. We can properly speak, therefore, of an alcoholic, neurasthenic or saturnine pseudo-paresis, and possibly also of a syphilitic pseudo-paresis, limiting the term in this case to a purely transient disturbance of the cortical functioning without any serious or irreparable lesion. Whether such cases often occur is exceedingly doubtful, but the exceptional instances are probably accountable for the rare cases of cures reported of progressive paresis.

Although, as already stated, FOURNIER seems to have abandoned the idea of a syphilitic pseudo-paresis, this is still maintained by many, and the more strenuously that the conviction has been growing of late years among alienists that nearly all, if not all cases of paresis are of syphilitic origin, or at least have had syphilitic antecedents. This, which is in its way, if true, a very decided advance in the pathology, meets with strong objections from some quarters. Syphilis being considered a disreputable disease, is not, to many, a very acceptable origin for a disorder that is becoming increasingly frequent in civilized society. Some of the efforts to discredit it as a cause have been so much overdone as to call out the sarcasm from FOURNIER that, according to their statistics, a man should acquire syphilis in his youth to insure against paresis in middle age. An English exchange attributes the confusion as to what is paresis or general paralysis to the growing belief in its specific origin, and speaks virtuously against the disposition to accept assumptions for facts and *post hoc ergo propter hoc* arguments in medicine. The fact in itself, however, that this theory of the causation of the disease has steadily grown in favor in spite of sentimental objections, is a strong argument for its validity, and at present it is beginning to claim both numbers and the weight of scientific authority on

its side, though it can not yet be accepted as an absolutely proven or universal truth. The cases that are not syphilitic are coming to be admitted as probably the rare exceptions; and the term "syphilitic pseudoparesis" will probably soon be limited to those forms occurring after recent syphilis and amenable to specific medication. Even these cases can not be always definitely delimited, and the elements of time and continued observation should always be taken into consideration in the diagnosis.

A possible cause of confusion is the occurrence of senile changes in the brain. Undoubtedly there have been too many cases of paresis diagnosed in men over 50 or 60 years of age, and some cautious alienists have declined to recognize it as occurring after the latter limit. It is very possible, with an atheromatous condition of the vessels, for cortical degenerations to occur that may produce symptoms very closely resembling those of genuine paresis, and this should therefore always be reckoned with in making the diagnosis at any age.

While the occasional difficulties of diagnosis of paresis may be admitted and the possible occurrence of pseudo forms acknowledged as actual or probable, it would be no advance to question or give up its reality as a separate and well-marked disease. It may be often simulated, its characteristic of incurability may even be now and then discredited by some well observed case, it may have long and puzzling remissions, its pathology may be in doubt in some important regards, but as a cortical disease characterized by a general, steadily progressive mental and physical deterioration, it exists as indisputably as any other affection with which mankind is cursed.

"THE GREAT UNREADY" VACCINATION COMMISSION.

The editor of the *Practitioner*, in his masterly Jenner number for May, recalls the fact that his great nation has been waiting seven years for the Royal Commission to speak. The courts are in a measure "tied up," waiting for a decision; while the medical profession is almost dreading a decision. The editor is moved to compare the situation with that of which HORACE wrote when he told about the peasant who took his seat on the bank of a river to wait and see the stream flow past. Or, as another writer has shaped it, "The report will not appear until just after the Greek Kalends."

One good point is made in the article to which we refer, and one that should never be lost sight of, namely: It is always the poor, the ignorant and the helpless who suffer from the fads of faddists; we and ours are relatively free from danger.

Through epidemics and rumors of epidemics the Royal Commission on Vaccination still sits in sphinx-like silence. Smallpox may come and smallpox may go, but it goes on forever. In appointing the Commission, on May 29, 1889, the Sovereign gave its members the following injunction: "And our further Will and Pleasure is that you do, *with as little delay as possible*, report to Us under your hands and seals or under the hands and seals of any five or more of you, your opinion upon the several matters herein submitted for your consideration." The manner in which these "right, trusty and right well-be-loved" gentlemen have carried out this injunction entitles them to the gratitude to at least one section of the community, to-wit, the antivaccinists. Owing to the delay in issuing the report, vaccination has almost died out in many parts of the country. Nearly a hundred Boards of Guardians have decided not to prosecute for refusal to obey the law, and in other cases where the Guardians do their duty in the matter magistrates hesitate to punish until the Commission has issued its pronouncement. A magistrate waiting for this event seems to be like the countryman in HORACE, waiting for the river to flow past. Meanwhile the public mind is necessarily in a state of suspense from which it is from time to time roused by such incidents as the present outbreak at Gloucester. In whatever sense the Commission reports, it will now, I take it, be impossible to enforce compulsory vaccination—at any rate, until a series of epidemics once more teaches people the value of the protection they now make light of. "He jests at scars and never felt a wound." Well, we who know how to safeguard ourselves and those under our charge can look forward to the wrath to come without fear; but it is sad to think of the helpless children of deluded, ignorant, or careless parents.

In this connection, the *Medical Press and Circular* calls attention to the fact that vaccination has its friends in the House of Commons: "Despite the delay, and the supposed opinions expressed, in the forthcoming report of the Royal Commission on Vaccination, it is evident that the House of Commons is a strong center favorable to vaccination. In reply to a question last week in the House as to the recalcitrant action of a particular Board of Guardians, which had rejected a solution to enforce the Vaccination Act, the President of the Local Government Board stated that he had addressed a communication to the Board in question pointing out to them that by failing to enforce the provisions of the Act they were incurring a very grave responsibility. This announcement, it is especially worthy of note, was received with cheers, thus showing, unmistakably, that the results of the Gloucester epidemic have not been lost upon the Members of the House of Commons. The *Gloucestershire Chronicle* recently published some interesting statistics respecting the visitation of smallpox to the town to which some reference may be made, and here it may be said that the inhabitants of Gloucester owe a large measure of

gratitude to the editor of our contemporary for the unvarying, convincing and disinterested manner in which he has pointed out to his fellow townsmen the right course to take in regard to vaccination. In temperate language he has consistently advocated vaccination, simply because he has honestly satisfied himself that there was no other alternative to adopt in the presence of the terrible epidemic which was raging in the town. The statistics, moreover, which appeared in a recent number of our contemporary, regarding the epidemics, form a strong argument showing the utility of vaccination. The mortality among the total number of cases attacked was 21.7 per cent.; of the unvaccinated cases, 41.4 per cent.; of the vaccinated only in infancy, 8.5 per cent.; and of the uncertain cases, 32.2 per cent.

CORRESPONDENCE.

Testimonial to Dr. Davis.

PHILADELPHIA, PA., July 6, 1896.

To the Editor:—The note of Dr. Overlock in the number for July 4, relative to a medal demands some information. The medal to which he alludes is that ordered by the ASSOCIATION in 1875; see Vol. xxvi, page 35. In accordance with the instructions then given, I had a number of the medals struck off and sent to those who forwarded the money. The date on the medal does not mean that when it was issued, but the date of the origin of the ASSOCIATION. Although Dr. Davis was quite prominent in the work of organizing the ASSOCIATION, yet at that time no thought existed of having a medal issued with his likeness on it. The meeting of the profession to organize a national society was held in New York, as stated in the note in the JOURNAL, but Dr. Lewis Williams was not present. I make this mention with no captious spirit but to keep history straight. Yours very truly,

WM. B. ATKINSON M.D.

Another Explanation.

MONTGOMERY, ALA., JULY 6, 1896.

To the Editor:—I am sorry to have to trouble you with another explanation. But please allow me to say that I did not advocate before the Conference of State Boards of Health any such scheme of organization as that which you ascribe to me, nor anything in any way resembling it.[1] You are certainly writing under the influence of information that is entirely incorrect. This will be plain when the official Report of the Proceedings of the Conference of State Boards are published. The proposed bill has not taken definite shape. Only its larger provisions have been decided upon. It is some little time yet before Congress meets; and ever since the session of the ASSOCIATION in Atlanta I have been in a most miserable condition of health; during the last two weeks I have been in bed. Under these circumstances I have not been able to push this work as I otherwise would have done. I have been in correspondence with leading physicians in several states and have made some progress toward the proposed enlargement of the Committee.

In the meantime I take this opportunity to say through the JOURNAL OF THE ASSOCIATION that my Committee and myself will be greatly obliged for any suggestions looking to the completion of a wise and judicious bill; and this invitation is especially extended to the Editor of the JOURNAL.

Yours truly, JEROME COCHRAN, M.D.
Chairman of Committee.

[1] Our information was in writing, and from a member of the Conference.—ED.

If She Had Only Been Batteyized.

SAN DIEGO, CAL., July 9, 1896.

To the Editor:—Apropos of recent contributions to the JOURNAL by Drs. Boal and Daniel suggesting castration as a punishment for certain derelicts (degenerates?) I enclose an excerpt from a reliable source:

"Prof. Pellmann of Bonn University, who makes a special study of heredity, has been tracing the career of the descendants of Frau Ada Jurke, a notorious drunkard, who was born in 1740 and died in 1800. Her descendants have numbered 834, of whom 709 have been traced from youth by Prof. Pellmann. Of these, 7 were convicted of murder; 76 of other crimes; 142 were professional beggars; 64 lived on charity, and 181 women of the family led disreputable lives. The family has cost the German Government for maintenance and cost in the courts, almshouses and prisons, $1,250,000."

The details are quite as startling as those connected with the history of a colored female crook, which were published in Massachusetts some years ago. Herein is food for reflection.

Yours truly, C. M. FENN, M.D.

Not Antitoxin.

CHICAGO, July 13, 1896.

To the Editor:—In the JOURNAL of 11th inst. p. 113, appears the following:

"Another Death from Antitoxin.—Dr. W. J. Nolan of Chicago, writes the following to the New York *Medical Journal:*

"285 Loomis St., Chicago, June 24, 1896.

"To the Editor of the New York *Medical Journal: Sir:*—In view of the discussion now going on in the *Journal*, of which I have been three years a reader and subscriber, I frankly indorse the views of Dr. Winters in regard to antitoxin in diphtheria. Of one case I must write in terms of strong condemnation. The facts are as follows: I was called to see a boy, 8 years old, pulse rapid, temperature 105 degrees, and the laryngeal appearance quasi-diphtheritic. I began the ordinary treatment, in which quinin, carbolic acid and iron formed chief parts. The result next morning was very satisfactory; all alarming symptoms were decidedly not much in evidence. Some time in the evening of this better day, our antitoxin friends raided the house and began their injections à l'outrance. They did not inform me, I need scarcely say; but like birds of evil omen, they swooped down on a defenseless widow and daughters, and injected mightily, nay, as the sequel proved, mortally. Need I express an opinion after this on the discovery, or at least its manipulators? W. J. Nolan, M.D."

On reading the foregoing in the New York publication of the 4th inst., inquiry was at once made as the facts, with results which led to the following correspondence:

"Chicago, July 6, 1896.

"To the Editor of the New York *Medical Journal: Sir:*—Not so much in defense of antitoxin—which hardly needs any—as in common justice to its 'manipulators' in this city, as a correspondent, Dr. Nolan, styles them in his letter published in last week's *Journal*, I ask your publication of the enclosed statement of the facts in the case he therein refers to.

Faithfully yours, F. W. Reilly, M.D."

"Chicago, July 6, 1896.

"F. W. Reilly, M.D., Assistant Commissioner of Health.

Dear Doctor:—Referring to the letter in the New York *Medical Journal* of July 4, by Dr. W. J. Nolan of 285 Loomis St., I find by the notes in my visiting list I was called May 27 to that case by Dr. Bergeron who had been called and finding it was a severe case of diphtheria, referred the people to me saying he would prefer not to treat diphtheria. On my arrival I found the case extremely severe, advanced beyond the fourth day, Klebs-Löffler bacilli and also strepto- and staphylo-cocci in abundance, and every evidence of septicemia. I gave an unfavorable prognosis but injected antitoxin with a forlorn hope; and also immunized all the other five children in the family. Then I was informed by the mother that Dr. Nolan had been called on Sunday, May 23, made his second visit on Monday, and then abandoned the case. Thereupon they sent for Dr. Bergeron and by him the case was referred to me. The case was strictly a charity one and so known to be by Dr. Bergeron, and I was compelled to furnish medicine at my own expense. The child died as I predicted on my first visit. None

of the children immunized contracted the disease. The mother, who was not immunized, contracted diphtheria, was treated with antitoxin and promptly recovered.

"I did not see the case nor was antitoxin administered until July 27, the second day after Dr. Nolan had abandoned it. The mother—'the defenseless widow'—had given him the last dollar she had in the house. She is eminently satisfied with what I did for her child, as are all of the family, and unstinted in her condemnation of Dr. Nolan for his 'heartless neglect,' as she terms it. Respectfully submitted,

E. P. Murdock, M.D., Medical Inspector."

I am this morning in receipt of the New York *Medical Journal* of the 11th inst., but fail to find therein any mention of Dr. Murdock's statement of facts and am, therefore, compelled to appeal to your sense of editorial justice to say whether the caption "Another Death from Antitoxin" now seems to you to be warranted. F. W. Reilly, M.D.

Our Journal.

Tecumseh, Mich., July, 4, 1896.

To the Editor:—The Journal of the American Medical Association was born and passed through its early infantile life in Chicago, arrived at robust manhood in that city, and in Chicago I vote for The Journal to remain, where it will be in touch with cosmopolitan schools and hospitals.

Respectfully, J. F. Jenkins, M.D.

NECROLOGY.

Charles Styer, M.D., a graduate of the University of Pennsylvania, Medical Department, of 1862, died at his home

CHARLES STYER, M.D.

in Philadelphia, July 6, aged 46 years. He was surgeon to the 90th Regiment, P. V., and in June, 1867 he entered the regular army as assistant surgeon, served on the frontier in the southwest mainly, until he resigned June, 1878, to engage in private practice. In 1885, he was appointed Acting Assistant Surgeon in the United States Marine-Hospital service at Philadelphia. For several years he was also one of the Medical Staff of the German Hospital of Philadelphia. He was a prominent member and medical examiner of several social and beneficial orders, being Surgeon-in-Chief of the Royal Arcanum. He was also a member of the Grand Army of the Republic and has been Post Surgeon, Post Commander, Medical Director of the Department of Pennsylvania and Surgeon-General of the National Encampment. Dr. Styer leaves a widow and two sons. His death was found to have been caused by an aneurysm.

Sir George Johnson, M.D., whose death has recently been announced, was a man of mark in his day and generation, in the great metropolis where his life-work was done. Sir George was born in November, 1818, at Goudhurst, in Kent, and was educated at the Grammer School there. At 19 he was apprenticed to a relative, a general practitioner, residing in Cranbrook, Kent, and two years later, in October, 1839, he entered the Medical School at King's College, London, where he greatly distinguished himself as a student, gaining many prizes. In the wards he was a clinical clerk under Dr. Todd, and a dresser to Sir William Ferguson, and after qualifying, he filled the post of house physician and house surgeon. In 1844 he received his degree of M.D. from the University of London, after having passed through a creditable university career. The position to which he had attained as a prominent alumnus of his medical school at once marked him out as a likely candidate for an appointment on the staff of his hospital, and in 1857 he was elected one of the assistant physicians, succeeding Royle as Professor of Materia Medica and Therapeutics. In this appointment he continued until 1863, when he became Professsor of the Principles and Practice of Medicine, which appointment he resigned in 1876 when he became professor of clinical medicine. His connection with the Royal College of Physicians began when he became a member of that body in 1846. Four years later, an unprecedently short period, he was elected a Fellow of the College, and subsequently he held the offices of Examiner in Medicine, Junior Censor, Senior Censor, and Vice-President. The blue ribbon of science was conferred upon him in 1872, when he was elected a Fellow of the Royal Society. The following are further honors of which he was the recipient: In 1884, the Presidency of the Royal Medical and Chirurgical Society; in 1889, physician extraordinary to the Queen; in 1892, knighthood.

Dr. George W. Ryan died at the Betts Street Hospital, Cincinnati, July 11, of cirrhosis of the liver after a lingering illness. Dr. Ryan was born in Louisville, Ky., thirty-six years ago and graduated with honors from the university of that city. For a number of years he was connected with the Hospital of the Ruptured and Crippled of New York, where he achieved a national reputation for his surgical work. He came to Cincinnati about twelve years ago and at once commanded a large and lucrative practice. At the time of his death he was a member of the surgical staff of the St. Mary's and Presbyterian hospitals, also a professor in the Ohio Medical college. Dr. Ryan was a whole-souled fellow well met and a gentleman who counted his friends by the hundreds. He was a single man and one of the most popular members of the University club. The remains were shipped to Louisville Saturday, where interment took place.

James S. Hope, Passed Assistant Surgeon United States Navy, who had been on duty at the Pensacola Navy Yard for two years past, died July 1, in Roosevelt Hospital, New York, after a surgical operation had been performed upon him for a tumor. The remains were carried to Surgeon Hope's old home, Norfolk, Va., for interment. He graduated from the University of Virginia, medical department, Charlottesville, Va., in 1887.

SOCIETY NEWS.

New York State Medical Association—Second District Branch.—The twelfth annual meeting convened at Albany, June 26. Ten counties were represented.

The Tri-county Medical Society of Ford, Iroquois and Vermilion, Ill., met at Paxton, Ill., July 7.

State Board of Medical Examiners of New Jersey.—The annual meeting of this Board was held at Asbury Park, N. J., July 6. Dr. William Perry Watson of Jersey City was elected president, Dr. E. L. B. Godfrey of Camden secretary, and Dr. A. Uebelacker of Morristown treasurer. The next examinations of this Board will be held at Trenton, September 15 and 16.

West Virginia State Medical Society.—The officers elected at the annual election of this Society were published on page 53 of the current volume, but by some inadvertence the item incorrectly made reference to the "Maryland State Medical Society."

Scott County (Iowa) Medical Society.—The regular quarterly meeting and annual election of officers was held at Davenport, Iowa, July 2. Officers elected for the ensuing year: President, Dr. J. H. Kulp; vice-president, Dr. E. Strohbehn; secretary, Dr. Adella R. Nichol; treasurer, Dr. Jennie McKown.

American Dermatological Society.—The next meeting will be held at Hot Springs, Va., September 5 to 10. Everything will be done to make the meeting a success and several papers on interesting subjects have been already promised. Dr. White will open a general discussion on the subject: "What Effect do Diet and Alcohol have upon the Causation and Course of the Eczematous Affections and Psoriasis." Charles W. Allen, M.D., Secretary, 126 E. 16th Street, New York.

Eastern Iowa District Medical Association.—The twenty-fifth annual meeting was held in Fairfield, Iowa, July 25. Papers were read by Drs. J. H. Etheridge, of Chicago; W. B. La Force, of Ottumwa; R. M. Lapsley, of Keokuk; D. W. Overholt, of Columbus Junction, and T. J. Maxwell, of Keokuk. The following are the officers elected for the ensuing year: President, Dr. W. H. Holliday, of Burlington; vice-president, Dr. Snook, of Fairfield; secretary and treasurer, Dr. M. C. Carpenter, Fairfield. The Association will meet next at Columbus Junction in November.

BOOK NOTICES.

The Student's Medical Dictionary, including all words and phrases generally used in medicine, with their proper pronunciation and definitions based on recent medical literature. By GEORGE M. GOULD, A.M., M.D., with elaborate tables of the bacilli, micrococci, leucomaines, ptomaines, etc.; of the arteries, ganglia, muscles, and nerves; of weights and measures; analyses of the waters of the mineral springs of the United States, etc. Tenth Edition, rewritten and enlarged. Philadelphia. P. Blakiston, Son & Co. 1896. 8vo, cl. Pp. 701. Price $3.25.

"The present volume," says the author in his preface, "is an entirely new one and is designed to take the place of the 'New Medical Dictionary' and the 'Student's Medical Dictionary,' the plates of which have been destroyed." This work is intended for students, and as an introduction to the larger and more expensive "Illustrated Medical Dictionary."

Few works have attained popularity more speedily than the dictionaries of Dr. Gould, and deservedly so. The early acceptance of the orthography advocated by the American Association for the Advancement of Science, and the undeviating way in which it has been carried out, have doubtless had much to do with their extensive sale. The only feature that is open to criticism, for the JOURNAL four years ago adopted the spelling advocated by Dr. Gould, is that of pronunciation. Anyone who may listen to any half dozen readers in our medical societies will likely hear the common medical terms differently pronounced by each. Surely the time has come when medical men may, as Dr. Foster has shown, adopt that pronunciation, which will enable them, without regard to nationality to give a common pronunciation to all words in common use by the profession. We commend this work as we had the pleasure of commending its predecessors by the same author.

Quain's Elements of Anatomy. Edited by EDWARD ALBERT SCHAEFER, F.R.S., and GEORGE DANCER THANE. In 3 Volumes. Appendix, Superficial and Surgical Anatomy, by PROF. G. D. THANE and PROF. R. J. GODLEE, M.S. Illustrated by 29 engravings. 8vo, pp. 76. Tenth edition. Longmans, Green & Co. London, New York and Bombay. 1896. While anatomy should not be studied "superficially," yet superficial or topographic anatomy can not be too deeply graven into the brain of the student and practitioner; indeed, the more attention paid to superficial anatomy, the "landmarks," as Holden termed them, become more clearly visible, the diagnosis is more easily made, and error is farther removed.

The student, and as well the surgeon, will find his knowledge increased and his hand steadied by the careful perusal of this appendix to Quain's well-known elements of anatomy, prior to making a new dissection or undertaking a new operation.

(1) Whittaker's Anatomic Model. (2) The Anatomy of the Human Head and Neck. A Pictorial Representation of the Human Frame and its Organs. Graphically illustrated by means of superimposed plates, with descriptive text by DR. SCHMIDT. English translation by WILLIAM S. FURNEAUX. New York: Thomas Whittaker (1, 3 and 5 Bible House) Publisher.

These books are pictorial representations showing the anatomic relations of the parts. The plates are superimposed very ingeniously, and are intended for students in general, whether in medical classes or engaged in the study of anatomy as collateral to other studies. The coloring, while not altogether natural, is not so far off as to be violent, and the relations of the parts are as accurately shown as may be on a plane surface. We commend the works for the purposes for which they are intended, and as an aid to the teaching of anatomy in the public schools their value can scarcely be overestimated.

Keil's Medical, Pharmaceutical and Dental Register-Directory, with special medical, pharmaceutic and dental departments containing detailed information of colleges, hospitals, asylums, societies, with street lists, etc., for Pennsylvania, New York, New Jersey, Maryland, Delaware and District of Columbia. Fourth edition. GEORGE KEIL, Editor. Philadelphia: Burk & McFetridge Co., Publishers, 308 Chestnut Street. 1896.

This directory has the merit of being up to date and is one of the most complete of its kind. Its rather lengthy title fully explains its scope. Every editor, teacher and writer, and as well the general practitioner finds such compilations extremely useful.

PUBLIC HEALTH.

Chicago Health Report for June shows total number of deaths in the month as 1,895. The annual death rate on the basis of the school board's census for the year ending June 30 was 14.83 per 1,000 of population. Last month's rate was 1.17.

Utah State Board of Medical Examiners.—This board, which has been but temporarily organized since its appointment by Governor Wells, met June 29 and effected permanent organization. Dr. Bascom was elected president, Dr. John T. White secretary, and Dr. Dart treasurer.

Baltimore (Md.) Health Statistics for June.—Health Commissioner McShane's summary for June shows that during that month 647 deaths occurred in Baltimore, a decrease of 136 as compared with June, 1895. Of these 467 were whites and 180 colored. Forty-two died of infectious diseases and 76 of consumption.

Will the Consultant get His Fee? Probably Not.—A curious episode has arisen from a difference of diagnosis between two practitioners in a burgh in the west of Scotland. Dr. A. certified a case of enteric fever and sent the patient to a burgh hospital. Admittance, however, was refused, as Dr. B. who had charge of the hospital, diagnosed the case as one of meningitis. Dr. A., in no wise convinced of this view, sent for Dr. C., a consulting physician from Glasgow, who had no doubt the case was really one of enteric fever. Now Dr. A. maintains that Dr. C.'s fee of ten guineas is an expense to which he had been put by the burgh medical officer, and accordingly he claims that the town council ought to refund him this sum.

The Chinese Women and Their Feet.—The cruel and ungainly practice of compressing human feet in China has called forth some official medical remarks on the subject to the Chinese Maritime Customs. When questioned closely, not one woman in a hundred will deny that she is a constant sufferer owing to the tight bandages. Many foreigners in China imagine that after a woman reaches maturity she is free from pain, but it is contended that this is not the case. Dr. Macartney, the writer of the report, never found an elderly woman who did not complain of pain. Women with compressed feet can not stand for any length of time without great suffering; in addition to the agony endured in the early period of binding, paralysis of the legs frequently ensues on the practice, and in every case treated by him the patient recovered rapidly when the feet were unbound and left free.

An Echo from Russia; "Let us have a Department of Public Health."—The Russians have taken up the cry, and are urging the creation of a minister and department for this purpose, which is said to be more needed in Russia than in any other country for many reasons. The present arrangements for epidemics, etc., are utterly inadequate. Levitsky states that the total medical supplies received at one large station in the Ural, where an epidemic of cholera and typhus was raging recently, amounted in all to one ounce of sublimate, one kilogram of impure phenic acid, 20 grams of tincture of valerian and 20 grams of "Inosemzev' Drops." The present annual appropriation for hospitals in the provinces is the same for each (8400–8500) irrespective of the size, so that one with 595 beds receives no more than one with 45.—*Bulletin Médicale*, June 21.

Duluth (Minn.) Water Supply.—The epidemic of typhoid fever that carried off many of the citizens of Duluth a year ago is brought to mind by a hearing which is called for Monday before Attorney General Childs. Ellsworth Benham, corporation counsel for Duluth, will appear before the attorney general and make an application for a writ of quo warranto to compel the Duluth Gas and Water company to appear in the supreme court and show cause why its charter should not be declared forfeited to the city. The ground on which the application is made is that the company failed to comply with the requirements of its charter, in that it did not supply good and wholesome water to the city. The application charges the company with wilfully placing its intake pipe close to the sewage discharge from the city of Duluth, so that it received the sewage and surface waters of Lake Superior, and that as a result of the use of the water by the residents of Duluth several epidemics of typhoid fever raged in the city and hundreds of people died.

Food Laws in Pennsylvania.—The Pennsylvania State Department of Agriculture has just issued formal decisions regarding the provisions of the food laws. Truth and precision in the labeling of foods are insisted upon, and adulteration is distinctly defined. Goods sold as "pure" must be pure, if mixtures they must be marked "compound" in a conspicuous place on the label. A very wise provision is that in any "mixture" or "compound" there must be no fraudulent or worthless article, only such as are designated "ordinary articles or ingredient of articles of food." "Salicylic acid is prohibited as a preservative." This acid has been largely used as a preservative for catsups, mince-meats, etc. Coloring is allowed in food products (except milk, which must contain no coloring matter or preservative) provided the material used is not injurious, but when used in canned vegetables the package must be distinctly and plainly marked "artificially colored." Spices do not admit of any foreign matter and therefore can not be sold as "compounds," or placed upon the market in an adulterated condition. The Pennsylvania market for ground cocoanut shells, corn meal and other standard adulterants will fall off under this construction of the law. Definite limits are prescribed for vinegar, pickles, lard, preserves, jellies, etc. All the fifteen formal decisions are plain, honest and just. They permit harmless admixtures when definitely stated, but prohibit fraud, misrepresentation and employment of any materials whatsoever which are a menace to health.—*Pharmaceutical Era*, June 25, 1896.

Illinois State Board of Health.—The regular quarterly meeting of this Board was held in Chicago, July 7. Dr. F. W. Reilly of the Chicago Health Department presented rules regulating the practice of midwives and proposing to grant greater authority to municipalities in this matter, which were favorably received by the Board. A committee was appointed to draft resolutions on the death of Dr. O. O. Baines. A request was made that the diplomas of the Harvey Medical College of Chicago, be not recognized as it is alleged that this college does not fulfill the requirements of the Board. The matter was referred to the committee on the administration of the Medical Practice act. The Secretary made statement concerning the "Illinois Health University" of Chicago, to the effect that an opinion had been asked of Attorney General Moloney as to the possibility of prosecuting this fraudulent institution under the statute. This concern being chartered may under the law issue medical diplomas, but they are not recognized by any State Board of Health and a number of persons have been victimized. In case this can not be done it is hoped that the legislature will see fit to enact a law which will apply to cases of this kind.

Do Flies Spread Tuberculosis?—Dr. W. R. Aylett, (*Virginia Med. Semi-monthly*, June 26, 1896) gives details of investigation: "I smeared a cover-glass with sputum from a well-advanced case of tuberculosis and placed it upon a clean sheet of paper, placing around it seven or eight clean covers. The paper and covers were then placed where flies could have ready access and soon quite a number were feeding on the sputum. An inverted tumbler was lowered over them, making them prisoners without their knowledge. One of the prisoners soon deposited a 'speck' on one of the clean covers. To prevent this becoming contaminated by their feet, I removed it at once. Within an hour or two all of my covers were specked. The covers were then put through the regular cover-slip preparation, carbo-fuchsin being used for the bacilli with methylene blue as a contrast stain. On microscopic examination, the specks were found to contain from one to three thousand bacilli tuberculosis each. I have not yet tested the virulence of bacilli so obtained, but they show no signs of disintegration, seem as perfect and stain as readily as those from pure cultures."

Death from Eating Ice.—In the annals of the Health Office and Registry of Deaths, of Philadelphia, a half century ago or more, occurs several times, the diagnosis of "Death from drinking too much ice water." In these days of free refrigerated drinking fountains and universal use of ice in the household, there may occur, each year, a number of such cases; but they are recorded now under a pathologic and not under an etiologic heading. Last week, however, the coroner, who had investigated the death of two children in one family, gave a certificate of death from dysentery occasioned by the excessive use of ice. As they had indulged freely in so called "snow-balls," made with shaved ice flavored with fruit syrup, it was suggested that the fruit syrup might have contained some poisonous ingredient or adulterant, but the coroner's jury basing their opinion on the results of Prof. Leffman's analysis of flavoring syrups last year, which showed them to be harmless, came to the conclusion that the eating of so much shaved ice was the real cause of the fatal illness. In view of the fact that children are constantly buying and eating these balls of shaved ice, during the hot weather in our large cities, it is pertinent to inquire as to the purity of the ice, since Prudden and others have shown that polluted water is not made pure by freezing and that vari-

ous pathogenic germs are contained in ice coming from a contaminated source. Infected ice is capable of communicating infection and causing local epidemics of disease. Typhoid bacilli survived freezing in the epidemic at Plymouth, Pa., some years ago. Pus organisms and the streptococci of erysipelas are commonly found in ice coming from a source contaminated by drainage, as well as many bacilli allied to the comma bacillus or spirillum of cholera. With these observations in mind, it would be well for the guardians of the public health to take into consideration the ice supply of large cities, as well as that of milk, and especially to prohibit the sale of ice to be eaten by young children, unless it is of good quality. There are as good reasons for having sterilized ice as exist for the use of sterilized water or milk; for children's use these should be of the best quality and above suspicion.

Washington State Medical Examining Board.—The regular semi-annual meeting of the Washington State Medical Examining Board was held at Spokane, Wash., July 7 and 8. But six applicants for license to practice within the State appeared before the Board, one of whom failed to pass.

Washington State Board of Health Favors a Department of Health.—At the last regular meeting of the Washington State Board of Health the following resolution in favor of a national department of health was unanimously adopted, viz.:

Resolved, That this Board is in favor of the establishment of a national department of health upon the broadest and most comprehensible grounds possible. That we do not endorse the action of the National Conference of the States Boards of Health held in Chicago in June last. Believing that this does not represent the views of the majority of the boards of health of the various States, the secretary is hereby instructed to correspond with the boards of other States and also with other boards of health, with the view of ascertaining the opinions of the various boards upon the advisability of the establishment of such department by the national government.

MISCELLANY.

Serum Treatment for Sheep Rot.—A member of the Pasteur Institute of Algiers has discovered a serum that will prevent "sheep-rot." All animals "vaccinated" either escape or have a mild form of the disease, from which they invariably recover.

University of Vermont.—The 43d annual commencement exercises of the medical department of the University of Vermont were held at Burlington, Vt., July 6. The graduating class numbered fifty-two. The valedictory was delivered by Dr. J. L. Marshall. The address of Rev. P. M. Snyder was on the Relation of the Physician to the Preacher.

The Roentgen Rays in the Witness-Box.—We note that the trial of an action for damages at Nancy, in France, the surgeon who had charge of the injured plaintiff was accused of having caused the damage by mistaking a dislocation for a fracture. The accusation was sustained by producing in court a Roentgen photograph, which showed clearly the bones in the dislocated position without any fracture.

New Apparatus for Anthropometric Measurements of Criminals.—An anthropometer and craniograph invented by a lawyer, Anfosso of Fossano in Italy, are commended by Lombroso for their extreme simplicity compared to Bertillon's complicated apparatus, besides their other advantages. The *Gaz. degli Ospedale e delle Clin.* of June 20, adds that every police station should be supplied with them.

Roentgen Ray Visible to Insects.—The *Centralbl. f. Physiologie* of June 13, describes some experiments with insects placed in a box, one side of which was of wood and the other of lead, and exposed to the direct Roentgen ray. The insects all assembled on the side of the box permeable to the ray, except those that had been blinded. The assumption is that it was visible to them and attracted them.

Missouri Rule as to Burden of Proof of Insanity.—The supreme court of Missouri holds, in the case of State v. Wright, decided June 2, 1896, that the burden is on a defendant who interposes a plea of insanity to sustain that defense to the reasonable satisfaction of the jury. It says that it is in the nature of a plea of confession and avoidance. It confesses the homicide, but denies the crime of it. The court also holds that a medical expert was very properly permitted to give his opinion respecting the sanity or insanity of the defendant, having for a basis the hypothetical case, together with what he had learned from an examination of the defendant.

Treatment of Acute Pneumonia with Injections of Artificial Serum.—Bassi of Lucca has found intravenous injections of artificial serum of benefit in acute pneumonia, when a fatal termination is imminent. He describes several cases in the *Gaz. degli Ospedale e delle Clin.* of June 6, and dwells upon the importance of gaining time with them until the crisis is past. The amount injected was from 120 to 250 grams; the instrument used was a Pravaz syringe connected with a reservoir, and the injections were made in the median basilic vein of the left arm, the day before the crisis was anticipated when possible.

Filters for Army Use.—Coccone has a study of the best portable filter for use in the army in the *Giornale Medico der R. Esercito* for April, and recommends the Berkefeld-Nordtmeyer as the most practicable for the purpose, using two alternately, a day each, and boiling the one not in use in a camp kettle for an hour. He suggests a few slight modifications to add to its solidity and capacity.—*Gaz. d. Osp. e d. Clin.*, June 11.

The Whale Cure for Rheumatism.—It is reported that at the town of Eden, a place in Australia, which stands on the shores of Twofold Bay, there is a hotel where rheumatic patients congregate. Whenever a whale has been taken the patients are rowed over to the works in which the animal is cut up, the whalers dig a narrow grave in the body, and in this the patient lies for two hours as in a Turkish bath, the decomposing blubber of the whale closing around his body and acting as a huge poultice. This is known as the "whale cure for rheumatism."—*Annals of Hygiene*, July, 1896.

Anomalous Case of Cinchonidia Poisoning.—Dr. William Pepper relates the case of a patient suffering from paroxysmal tachycardia, in whom a pill of digitalis and cinchonidia sulphate—one grain of the latter—produced, within three hours, severe abdominal pains, nausea, extreme weakness and areas of angio-neurotic edema. The hands and feet especially were much swollen, the color varied from moderate congestion to extreme pallor; there was intense itching, the pulse was hard during the period of intoxication, in marked contrast to the soft pulse previously noted. The conditions continued about twenty-four hours.—*University Med. Mag.*, July, 1896.

Li's Bullet Located by the Roentgen Rays.—While in Germany recently, the Chinese statesman, Li Hung Chang, took advantage of an opportunity to have the bullet which he carries in his cheek located by the Roentgen Rays. It will be remembered that when in Japan, arranging the treaty of peace between that nation and his own, he was assaulted by a would-be assassin, who, it was feared at that time, had been only too successful in taking the life of this truly great man. The picture secured shows the tract of the wound through the tissues of the cheek and the encysted missile slightly below the point of entrance.

A Million Dollar Prize.—The following curious notice has recently appeared in the New York City newspapers: "One Million Dollars Reward.—To Physicians, Surgeons, Scientists, Wise Men, and all others whom it may concern: Be it known that I, Charles Broadway Rouse, who possess considerable wealth, hereby agree to pay the sum of $1,000,000 to any human being who restores to me my sight." The advertiser is

an eccentric Virginian who has done business in New York since the late war, and who is suffering from atropy of the optic nerve. Some time ago he discovered that one of his former employes, a man by the name of Martin, was affected in the same way as himself. He took a great interest in his case and was very kind in securing the best medical treatment for him and otherwise providing for his welfare and comfort. Out of gratitude for this kindness he has offered to subject himself to any kind of treatment that is thought worthy of trial, and any one who believes that he has a chance of winning the million dollar reward must first test the efficacy of his treatment on Martin.

Gunshot Wound of the Stomach.—Dr. L. A. Woodson (*Nashville Jour. of Med. and Surg.*, June, 1896) reports a case, male, 25, operated on sixteen hours after wound was received. The patient was weak from loss of blood and abdomen distended from internal hemorrhage. The ball, 38-caliber, entered the stomach at the cardiac end and had severed the gastro-epiploica sinistra artery, which was still bleeding. The ball emerged to the right of the esophageal opening, then made another perforating wound, an inch long, in the pyloric end of the stomach. The ball was not located but the direction of its course indicated lodgement in the liver. Temperature the day after operation, 98.5 degrees. He was discharged cured on the twenty-first day. The points of interest in this case were the rapidity of healing and completeness of cure, the absolute absence of fever after the operation was performed, notwithstanding its gravity and extent, and finally that an artery the size of the one severed should have remained unsecured for sixteen hours and not have resulted in death from hemorrhage.

The Therapeutics of Exercises.—Dr. Randolph Faries says: Many physicians prescribe exercise, never dreaming that they are already adding coals to the fire of the disease. For example, one physician will tell a patient who is suffering from brain overwork to take riding lessons, forgetting that mental operations are required to learn to sit properly and guide the animal at first; another will advise bicycle-riding which also requires mental effort. Prescribe an involuntary exercise and the blood will be drawn from the brain to the part employed because wherever there is movement there we shall find the blood flowing in greater quantities; and in this way we deplete the overcharged blood vessels in the cerebral mass.—*Annals of Hygiene*, July.

No Duty to Provide Specialist.—Jones v. Vroom, decided by the court of appeals of Colorado, May 11, 1896, was brought against a firm of physicians to recover damages for the loss of an eye, alleged to have been caused by the negligent and unskillful treatment of the defendants. They had been employed to treat the plaintiff for typhoid fever. There was no evidence, and in fact no complaint, that they did not bestow upon her all the attention and skill which the nature of the disease and her condition required. Indeed, she stated herself that she was cured of the fever as a result of their treatment. The only charge in the complaint which was proven was that one of the defendants failed to send her an oculist after he had promised to do so. The court holds that, under the circumstances, a nonsuit was properly granted. It says that the defendants were employed to treat the plaintiff for fever, and their employment imposed no duty upon them to provide her with a specialist for her eye. The court took into account, furthermore, that she seemed to have had no difficulty in procuring one when she set about it, and says that presumably he could have been gotten just as readily at first.

A Consulting Surgeoncy Declined.—Dr. Thomas H. Manley has lately declined the appointment tendered him in behalf of the University Medical College of New York, by the Commissioners of Public Charities. Dr. Manley was among the twenty-eight members of hospital staffs, summarily removed a year ago, by the reform government. It has since transpired, that the move was not in any sense political, but was the outcome of a medical college combination to secure all the clinical material. Hence, at the last meeting of the County Medical Association of New York charges of violation of the code of ethics of the AMERICAN MEDICAL ASSOCIATION were made against the faculties of the three regular medical colleges. It seems as that only one medical college of New York has remained loyal to the National organization—Bellevue—that must stand the brunt of attack in this investigation, as the College of Physicians and Surgeons and the University Medical College, it is said, recognize no code. The outcome of this investigation will be watched with interest, for since the beginning of the medical upheaval of last year in the New York Hospitals the JOURNAL has maintained that wrong and injustice was committed.

Study of Hematocatharsis.—The *Gazette Médicale de Paris*, June 20, reports some recent experiments by Delbet on the effects of diluting the blood with saline solution. He found that intoxication was prevented by it in only one case out of eight. This was a dog to whom three grams of sulphate of strychnin in a thousand solution had been injected. Immediately afterward 910 grams of saline solution were injected, and the animal was not poisoned by the strychnin, but recovered. He passed 530 grams of urine. The same dose administered later to the same dog without the saline injections, resulted in death twenty minutes later. Delbet found that where there were four millions of red corpuscles before the saline injections there were only three million afterward, but they were larger. No difference was observed in the white corpuscles. He finds that it is impossible to increase the pressure when it is normal or above, concluding from this that dilution is authorized even in cases of elevated pressure, as in eclampsia. On the other hand, a diminished pressure is brought up to normal by intravenous injections of saline solution, and it is not even necessary to inject an amount equal to what has been lost, as vigorous animals can lose a certain amount of blood without diminishing the arterial pressure, showing that they have a reserve of blood. Further experiments with dogs poisoned with atropin, and the pneumogastric consequently paralyzed, showed that the pressure of the blood could be diminished by hemorrhage and afterward increased by saline solutions, which proved that these phenomena were not dependent upon the pneumogastric.

Latent and Disguised Tuberculosis.—Maragliano's address with this title, delivered at the recent congress at San Remo, is published in *Gaz. degli Ospedale e delle Clin.* No. 47. It repeats the statement that traces of tuberculosis are found in one-third to one-fourth of all the necropsies. They may never have developed beyond the first original tubercle, as the organism may have proved strong enough to keep them in subjection by secreting the necessary antitoxins, and they may remain latent all through life. But debility from any cause, pregnancy, traumatism, may diminish the power of the organism to combat them, and they at once assert themselves, when an established case of tuberculosis is the result. To another category belong the cases of unsuspected tuberculosis infection of the blood which does not reveal itself in any of the usual ways, but only produces progressive anemia, emaciation, loss of appetite, suspension of the menses and other symptoms of what he calls dystrophic disguised tuberculosis. He distinguishes also another form, the trophic, with fever, intermittent or remittent, resembling typhus sometimes, with disturbances in the innervation, and even tumor of the spleen or exanthema. To this cause may be due the so-called "growing fever" of older children. It is very difficult to distinguish these forms of tuberculosis as the ordinary physical and bacteriologic tests fail. Maragliano has only attained certainty

by inoculating rabbits with the serum of suspected cases, or by inoculating the patient with tuberculin, as in testing animals.

Antivivisection.—Resolutions adopted at the Keystone Veterinary Medical Association, Philadelphia, June 9, 1896:

WHEREAS, Believing that the best interests of humanity are served by the judicious permission of experimental research on the lower animals, whereby the value of certain methods of surgical interference can only be determined, and the worth of certain lines of remedies, which at this particular time in the history of medical progress, seem to be based on more exact deductions than ever before, and the wisdom of fully testing these remedies on the lower animals demands no comment from any intelligent, thoughtful person;

Resolved, That we therefore believe that Senate Bill No. 1,552 is calculated to throw around these investigations unnecessary and unjust restrictions, and for these reasons merit our disapproval and we call upon our Representatives from this section to manifest our condemnation of this measure by their voting against the same. JOHN R. HART, President.

W. L. RHODES, Secretary.

Are the Bones Shaped by the Pressure of the Muscles?—Hirsch asserts that the internal and external structure of the bones as well as their shape, is determined by their functions, and that the pressure of the muscles and tendons is not responsible for the hollows or shape. The groove at the rear of the lower extremity of the tibia is an example of an apparent rut worn by friction, but in reality it is exactly the opposite, as the groove does not extend into the inner spongy part, and is not really a depression, but is produced by a couple of ridges thrown up to protect the bone. This same process occurs wherever there is friction, which explains the formation of the sesamoid bones, etc. To confirm his statement that these grooves were not the direct result of friction even in the course of generations, Hirsch examined the oldest neolithic skeletons in the museums, finding the two ridges even more pronounced on them than is the case at present. Another argument is that it is a mistake to suppose that all the muscles fit close to the bones, the biceps for instance; and it is drawn still further away when contracted. Hirsch asserts also that the bones are not injured by severe pressure as much as by gentle continuous pressure, such as the growth of a tumor, compressing and closing the circulation in the periosteum, while they are constructed to resist the strong pressure of walking, lifting, etc.—*Centralb. f. Chirurgie*, June 20.

"Physicians" Who Can Not Recover for Services.—The object of the Nebraska statute providing for a State Board of Health to regulate the practice of medicine, etc., the supreme court of that State says is the protection of the sick and afflicted against the knavery of quacks. For this reason the court holds, in the case of Maxwell v. Swigart, decided June 3, 1896, that the provision that "no person shall recover in any court in this State any sum of money whatever for any medical, surgical or obstetrical services, unless he shall have complied with the provisions of this act," etc., (Comp. St. 1893, Ch. 55, Art. 1, Sec. 15), negatives the right of recovery for such services where there has been a failure to file the certificate of the State Board of Health with the county clerk of the proper county, as required by the statute. To illustrate: The plaintiff in this case alleged that on or about Sept. 4, 1891, he had made necessary proofs upon which a certificate had been issued to him by the Nebraska State Board of Health, and that when his services were performed for the defendant between Oct. 15 and Nov. 29, 1892, he was one of the persons authorized by law to be registered. On April 20, 1893, the certificate of the State Board of Health referred to was filed in the office of the county clerk. After this the plaintiff brought this action to recover for those 1892 services, and recovered judgment in the district court for $275, the latter holding that the registration before suit brought, though after the services were rendered, was a sufficient compliance with the statute to entitle the holder of the certificate to recover the value of his services. But the supreme court holds otherwise and reverses that judgment, on the ground that the construction the district court put upon the statute was so foreign to the general scope of the entire act that it could not be tolerated.

A Case of "Death from Chloroform," Improperly so Called.—Dr. Wilkinson, of Birkenhead, England, reports in London *Lancet*, June 6, a case that very well illustrates a form of the reckless allegations which get into the public press concerning the use of anesthetics. To report this death as one of "death under chloroform" was entirely unjustifiable. The true cause of death, as shown by the clinical history and by necropsy, was that of rupture of the uterus consequent upon placenta previa. The case, as abbreviated from the report in the *Lancet*, was as follows: "When called to the case I found that there had been some severe hemorrhage. Under anesthetics version was performed. The hemorrhage then ceased, and as I felt the placenta loose in the vagina I removed it with my fingers. Chloroform was given only at intervals and was ceased before the delivery of the head. Six drams were given. The patient rallied, took some ergot and assisted us with the placing of the binder, and asked if all was over. She then became restless, and after about twenty minutes we saw that death was threatening and informed the friends. The restlessness had brought on fresh hemorrhage. More ergot was given and ice was placed in the vagina, and the uterus felt for from the outside. Owing to the abdominal fat, however, it could not be felt. The pulse was 96 and hardly to be perceived, partly on account of the superimposed fat. The patient died two minutes after we had informed her friends. No transfusion apparatus was at hand. The friends, supposing that she had died under chloroform, charged us with her death and, becoming maniacal, assaulted us. They seized the ornaments and attempted to strike us. The midwife (who sent for help immediately on seeing the case) was seized and would have been hurt but for our interference. At last we were obliged to send for the police to assist us to recover our belongings and extricate the midwife from the corner of the room where she was penned up. It was reported to the police and to the whole neighborhood that we had murdered the woman with chloroform. On this account I thought it best that an inquest should be held; otherwise I should have given a certificate. At the necropsy a rupture of the cervical and uterine tissues was found four inches in length and opening into the right broad ligament. The extravasated blood separated the layers of this, and I believe that during the subsequent restlessness the peritoneal covering burst, as was found. The immediate cause of death was hemorrhage. The delivery took me about an hour and a half to accomplish, during which time bleeding continued at intervals. After the arms were brought down I felt the os and it was then intact. The rupture, which I did not suspect, must have been caused by the passage of the large head, probably by the face (which was born first) passing over that site. The papers had the case reported as 'death under chloroform,' but the resumed inquest entirely relieved me from this charge, though the report has certainly done me harm."

The Murder of an English Physician in North Africa.—The *London Graphic* has the following account of the apparently causeless massacre of a physician and his family in Tunisia. Dr. Leach was for a time a resident of New York city, about ten years ago:

"Dr. and Mrs. Leach, who, with their little son, were murdered at Sfax, in Tunisia, last week, were for about five years missionaries of the North Africa Mission. After residing for a few months in Algiers they removed to Tunis in the summer of 1891, and with the help of other missionaries, carried on an important medical mission among the Mohammedans and Jews of that city. A few months ago Dr. Leach requested the council of the mission to permit him to open a new station at Sfax, one of the most important cities of Tunisia, about two

hundred miles south of his former sphere. At the present time it has a population of about forty thousand Mohammedans, a few thousand Maltese, Italians and Greeks. Dr. Leach removed from Tunis about the middle of March this year, and had since been occupied in getting his house and mission premises ready for work. He wrote on April 27 to the effect that the people were beginning to inquire when he would be ready to see patients, and he hoped to begin very shortly. It is difficult to understand the motive of the murder. Dr. Leach was a quiet and somewhat reserved man, very patient and kind in his dealings with the people. Both he and his wife spoke French, and he had a fair command of Arabic. So far as is yet known, it is thought that the crime was committed by Europeans with a view to robbery; but it seems impossible to be quite sure who the murderers were. The boy was about 5 years of age. The little girl, 18 months old, is the only member of the family who has been spared. Dr. Leach was born in 1860, at Rangoon, and was the second surviving son of Mr. William Leach, of the Medical Department of Her Majesty's Indian Army. He was educated in the military school at Fort St. George, and at Bishop Corrie's Grammar School, Madras, and studied Medicine at Edinburgh, where he qualified. He held the post of resident surgeon to the Children's Hospital, Birmingham, and afterward took one or two voyages as surgeon on the boats of the Clan Line. Then for two years he practiced at Forest Gate, East London. Subsequently he went to America to gain experience in medical mission work, under Dr. Dowkontt, of the International Medical Mission Society, to whom he was strongly recommended by the late Pastor C. H. Spurgeon. In 1889 he proceeded to Algiers with two American friends, and in 1891 joined the North Africa Mission."

The English Language.

We'll begin with a box, and the plural is boxes,
But the plural of ox should be oxen, not oxes.
Then one fowl is a goose, but two are called geese,
Yet the plural of mouse should never be meese;
You may find a lone mouse or a whole nest of mice,
But the plural of house is houses, not hice.
If the plural of man is always called men,
Why shouldn't the plural of pan be called pen?
The cows in the plural may be cows or kine,
But a bow if repeated is never called bine,
And the plural of vow is vows, never vine.

If I speak of a foot and you show me your feet,
And I give you a boot would a pair be called beet?
If one is a tooth and a whole set are teeth,
Why should't the plural of booth be called beeth?
If the singular's this and the plural is these,
Should the plural of kiss ever be nicknamed keese?
Then one would be that and three would be those,
Yet hat in the plural would never be hose,
And the plural of cat is cats, not cose.

We speak of a brother and also of brethren
But though we say mother we never say methren,
Then the masculine pronouns are he, his and him,
But imagine the feminine she, shis and shim.
So the English, I think, you all will agree,
Is the queerest language you ever did see.

—*The Commonwealth.*

The Economic Season.—Benham: "I wish you would ask Mr. and Mrs. Jones around to dinner to-morrow." Mrs. Benham: "What is your hurry about it, all of a sudden?" Benham: "I heard Jones' doctor telling him to-day that he mustn't eat any solid food for a week."—*Texas Siftings.*

Cincinnati.

The mortality report for the week ended Friday, June 10, 1896, shows: Deaths from all causes 112, annual rate per 1,000 16.64, deaths during the preceding week 116, deaths during corresponding week 1895 118.

Hydrophobia.—A case of hydrophobia was discovered in the city last week and the patient died in horrible agony.

The following have been added to the staff of the Betts Street Hospital: Drs. R. C. Heflebower, oculist; H. D. Hinckley, surgeon, and W. E. Kiely, general medicine.

At the last meeting of the staff of the Cincinnati Hospital the following were elected: Chief of staff, N. P. Dandridge; secretary, John Oliver; librarian, P. S. Conner; custodian of records, P. A. Marchand.

Dr. F. W. Hendley has been presented with an office desk, chair and set of instruments by the staff and employes of the Cincinnati Hospital.

The Obstetrical Society has adjourned until September. At the last meeting the papers read were: "Inflammation of the Endometrium," by E. W. Mitchell; "Pelvic Inflammation," by Charles Bonifield; "Technique of Curettage," by George E. Jones; "Pudendal Hematocele," by M. A. Tate.

Dr. William Pepper, President of the International Executive Committee, will spend the summer at a Spanish hacienda in California.

It is understood that arrangements are practically completed for two special trains of cars to be specially constructed for the Mexican trade. A dining-car will be provided for every three coaches. A lady's maid will be provided for each coach. Those desiring accommodations on these trains should address Dr. C. A. L. Reed of this city.

Meals for Hospitals.—The several thousand patients in the various State Insane Asylums and the Epileptic Asylum will eat a uniform breakfast, dinner and supper hereafter. At a meeting of the superintendents of the various State institutions at Columbus it was decided that the six months' bill of fare will be the same for all the institutions except that the epileptics for hygienic reasons are not allowed the full quantity of meat. A sample day's bill of fare is: At breakfast, beef stew, with three to five ounces of meat to each person, three ounces of potatoes, fruit *ad libitum*, bread with one-half ounce of butter, one-half ounce of coffee, and all the milk needed; dinner, chicken potpie, six ounces of the fowl to each patient, mashed potatoes, five ounces each, stewed tomatoes, pie or pudding, bread and butter, coffee and milk; supper, sweet cake, fruit, oatmeal, bread and butter, tea and milk.

Dr. Joseph F. Chau of Cleveland, has applied to the State Board of Examiners for registration. He is said to be a graduate of the Hong Wo College, of O'Moon, China.

The State Board has adopted the report of the investigating committee recommending the non-recognition of the Hygeia Medical, The American Eclectic, and the Campbell Vitapathic College.

Philadelphia.

Dr. John H. Packard having resigned from the surgical staff of the Pennsylvania Hospital, the board of managers elected William Barton Hopkins as his successor. Dr. Hopkins is a graduate of the University of Pennsylvania, and has served as resident physician and surgeon to the out-patient department of the Pennsylvania Hospital for a number of years. He will enter upon his new position August 1, when he will take charge of the wards for the fall term. Dr. Hopkins is a nephew of Dr. John Rhea Barton, and possesses much of the mechanical genius of his distinguished relative, who formerly occupied a prominent position in the surgical staff of the same institution.

Louisville.

House of Reform.—At a meeting of the trustees of the House of Reform appointed by the Governor, held recently, the following officers were elected: Mrs. Nellie G. Cheatham, wife of Dr. Wm. Cheatham, of this city, president; W. P. Walton, Stanford, secretary; D. H. Howard, Lexington, treasurer. The other members of the board are the following: Mrs. Lunsford Yandell, widow of the late Dr. Lunsford P. Yandell, of this city, Mrs. M. Charles and B. T. Conway, of Lexington. Propositions for buildings and sites for the location of the houses are being received by the board and no decision has as yet been reached.

Medical Laws.—The county attorney of Christian County has caused the arrest of over 100 physicians of that county charged with the violating of one of the laws which requires each physician to file a report with the county clerk before January 10 of each year containing a record of the births and deaths which have occurred in his practice for the year previous. Only one physician complied with the law, and the others claim that they were in ignorance of there being such a law on the statute books, though it has been in existence for twenty years. One doctor was fined $20 and costs, as an agreed case, and it will be carried to the court of appeals.

CITY HOSPITAL.—Superintendent Barbour states that at present there are 150 inmates to the hospital, an excess of fifty over the number usually there this time of the year. The increase has been caused by the unusual prevalence of dysentery and allied troubles among the poor at this season.

ST. MARY AND ELIZABETH HOSPITAL.—This hospital is located very near a switch of the Louisville Southern Railroad and the inmates have been very much annoyed of late by the unnecessary whistling of the locomotives. It was made the subject of a complaint by the officials, and as there is a law against the whistling of a locomotive within one-half mile of any hospital, it will be stopped without its being necessary to carry it to court.

Washington.

WEEKLY REPORT OF THE HEALTH DEPARTMENT.—The report of the Health Officer for the week ended July 4 is as follows: Number of deaths (stillbirths not included), 153; death rate per 1,000 per annum, 28.3; death rate per 1,000 per annum for the corresponding week last year, 23.97. There was a further increase in the number of deaths in the city during the past week. As shown by the reports to the health department the mortality reached 153 as compared with 146 in the week previous, and the death rate rose accordingly from 27.04 to 28.33. The principal causes were diarrheal diseases from which 47 deaths occurred, and consumption, of which 17 persons died. Of the mortality 91 were of children under 5 years old. While there was a slight increase in the number of fatal cases of brain and heart disorders, there was an entire absence of those of the lungs in an acute form. With the exception of diphtheria, the contagious maladies remained in abeyance. Of diphtheria 3 deaths occurred, 6 new cases were reported, 8 houses were relieved of quarantine, and 11 remained placarded. Of scarlet fever no death occurred, but 1 new case was reported, quarantine was raised from 3 houses, leaving 3 still in isolation.

THE DEFICIENCY APPROPRIATION BILL.—The Deficiency Appropriation bill contains the following item: Pan-American Medical Congress: To meet the expense of distribution of printed report of the transactions of the first Pan-American Medical Congress, at Washington, 1893, to be appropriated out of the unexpended balance of the appropriation for the entertainment of the delegates provided by the Sundry Civil Act, March 3, 1893, $900. All of the copies for foreign distribution have been mailed, the net cost of which amounted to $400.

PAN-AMERICAN MEDICAL CONGRESS.—The Auxiliary Committee of the Second Pan-American Medical Congress to represent the District of Columbia at Mexico is composed of the following-named physicians: Drs. H. L. E. Johnson, Chairman; John R. Wellington, Secretary; S. C. Busey, G. C. Ober, G. M. Kober, S. S. Adams, C. H. A. Kleinschmidt, W. S. Bowen, J. D. Morgan, L. Eliot, C. N. Richardson, G. L. Magruder, G. W. Cook, H. H. Barker, Walter A. Mills, Surgeon Generals Sternberg and Tryon.

APPOINTMENTS BY THE INTERNATIONAL EXECUTIVE COMMITTEE.—Among the recommendations of the first Pan-American Medical Congress was the appointment of an International Committee on Quarantine and one on Public Health. The executive committee have appointed the Surgeon General M.-H. S., chairman of the International Committee on Quarantine and Dr. H. L. E. Johnson, chairman International Committee on Public Health, with Drs. William Pepper and C. A. L. Reed as coadjutors. Dr. H. L. E. Johnson has been given charge as chairman of the Committee on Transportation.

DR. L. ELIOT has notified the committee that he will attend the Congress and read a paper on the treatment of hemorrhage by acetate of lead.

HOME FOR INCURABLES.—Plans are now under way for the construction of a new wing to the Home for Incurables. The new wing will be three stories in height, the same as the present building, and will be located near the northwest corner of the present structure. The plans have already been drawn up by Architect Walker and have been submitted for approval. The new wing will be erected out of a legacy left the institution by Mrs. Walcott, and will be devoted entirely to the accommodation of children afflicted with spinal trouble.

HOSPITAL FOR FOUNDLINGS.—A novel complaint has been filed at the District building against the Washington Hospital for Foundlings, at No. 1715 15th Street, N.W., to the effect that the crying of the babies is a nuisance to the neighborhood.

BOARD OF MEDICAL SUPERVISORS FOR THE DISTRICT.—The board of medical supervisors for the District of Columbia has been chosen and consists of Drs. C. H. A. Kleinschmidt, president of the board of regular practitioners; J. B. G. Custis, president board of homeopathic physicians; Thomas Robinson, president board eclectic physicians, with Messrs. J. J. Darlington and John Redout.

NEW OLEOMARGARIN LAW.—The new law governing the sale of oleomargarin is being rigidly enforced, and three prominent dealers were, upon conviction, sentenced to imprisonment and heavy fines for recent violations.

A NEW DENTAL SOCIETY.—The alumni of the National University Dental School have recently formed a new dental society. A large membership is expected.

THE PUBLIC SERVICES.

Navy Changes. Changes in the Medical Corps of the U. S. Navy for the week ending July 11, 1896.

Medical Inspector J. C. Wise, detached from the Washington navy yard, and ordered as a member of the board of inspection and survey, July 15.

Medical Inspector R. A. Marmion, detached from the board of inspection and survey July 15, and ordered to the Washington navy yard.

P. A. Surgeon S. S. White, detached from the naval academy and ordered to the "Thetis."

P. A. Surgeon G. A. Lung, detached from the "Thetis," ordered home and granted two months' leave.

Surgeon P. A. Lovering, detached from the New York naval hospital and ordered to the "Oregon."

P. A. Surgeon C. H. T. Lowndes, detached from the Washington navy yard and ordered to the naval hospital at Philadelphia.

Surgeon C. U. Gravatt, to Norfolk with draft of men and then home and three months' leave.

Asst. Surgeon R. G. Brodrick, to the "Franklin."

Change of Address.

Adams, S. S., from Washington, D. C., to Mountain Lake Park, Md.
Carpenter, Julia W., from Cincinnati, Ohio, to Omena, Mich.
Eads, S. E., from Science Hill to Somerset, Ky.
Goodrich, E. C., from Dyer Building to 807 Broad St., Augusta, Ga.
Ingold, Mattie B., from Baltimore, Md., to Hickory, N. C.
Kempker, J. F., from Keokuk to Valley Junction, Iowa.
Lukens, Anna, from New York, N. Y., to Wentworth Hall, Jackson, N. H.
Lanam, J. H., from Edinburg to Franklin, Ind.
Parker, W. T., from Groveland, Mass., to Toronto, Can.
Roseberry, B. S., from El Paso, Texas to Catskill, N. M.
Wiggin, F. H., from New York, N. Y., to Litchfield, Conn.
Woodbury, Frank, from Philadelphia to Glen Summit, Pa.

LETTERS RECEIVED.

Automatic Cycle Seat Co., Grand Rapids, Mich.; Alden, C. H., Washington, D. C.; Allport, Frank, (2) Minneapolis, Minn.; Armstrong, C. L., St. Louis, Mo.; Alta Pharmacal Co., St. Louis, Mo.
Bennett, A. L., Boulder, Colo.; Bailey, S., Mt. Ayr, Iowa; Bernd, Henry, & Co., St. Louis, Mo.
Coone, Berthena, Peoria, Ill.; Columbus Phaeton Co., Columbus, Ohio; Craig, G. G., Rock Island, Ill.; Chaille, S. E., (2) New Orleans, La.; Canton Surgical and Dental Chair Co., Canton, Ohio.
Dietz, R. E., Co., New York, N. Y.
Edwards, Walter E., Cadley, Ga.; Eads, S. O., Somerset, Ky.
Fairchild Bros. & Foster, New York, N. Y.; Faradizer Co., The, Indianapolis, Ind.; Fite, C. C., New York, N. Y.
Gibbs, W. E., New York, N. Y.; Graham, H. G., Chicago, Ill.; Gotham Co., The, New York, N. Y.
Holekamp-Moore Instrument Co., St. Louis, Mo.; Hollopeter, J. S., Houston, Ohio; Harris, John J., St. Louis, Mo.; Hardy, F. A., & Co., Chicago, Ill.
Koelling & Klappenbach, Chicago, Ill.; Kelly, W. R., Watonga, O. T.; Kolb, M. G., Cleveland, Ohio; King, F. R., Wiota, Iowa.
Liceaga, E., Mexico City, Mexico; Littig, L. W., Iowa City, Iowa.
Madden, John, Milwaukee, Wis.; Martin, J. A., Palestine, Ill.; Martin, E. J., St. Louis, Mo.; Meadows, Ira E., Mangham, La.; Maclean, Donald, Detroit, Mich.; Manley, Thos. H., (2) New York, N. Y.; McAllister, Alex., Camden, N. J.
Newton, R. C., Montclair, N. J.; Nye, Geo. L., Wythville, Va.
Ott, Isaac, Philadelphia, Pa.
Packer Mfg. Co., New York, N. Y.; Publishers' Collection Agency, St. Paul, Minn.; Pasteur-Chamberland Filter Co., The, Chicago, Ill.
Reed, R. Harvey, Columbus, Ohio.
Spencer, George A., Haverhill, Mass.; Schachner, August, Louisville Ky.
Van Etten, C. S. Rhinebeck, N. Y.
Ward, Milo B., Topeka, Kan.; Ward, M. R., Pittsburg, Pa.